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Stress, Temperament, and Academic Achievement

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STRESS, TEMPERAMENT, AND ACADEMIC ACHIEVEMENT

BY

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Abstract

The relationship among stress, temperament, and academic achievement in middle-school children was explored. It was hypothesized that: (1) various types of stressors differ in their relationship with academic achievement, (2) temperamental variables differ in their relationship with children's perceived stress, and (3) temperament mediates the relationship between stress and academic achievement.

Subjects were 263 sixth graders from three public school systems in southeastern New England. Using a group format, the subjects were administered two self-report measures of stress and one self-rating temperament survey, the predictor variables. The criterion measure was the Metropolitan Achievement Test scores for the 1991-1992 academic year.

For the first hypothesis, the analyses showed three out of five categories of stress to be predictive of achievement. Additionally, the results revealed two distinct types of stress, event-based stress and affect-based stress. It was the affect-based stress categories, which view stress in terms of its potential for emotional impact, that emerged more frequently as predictors for achievement.

For the second hypothesis, analysis of the self-rating temperament measure revealed six temperament attributes. Four of the temperament attributes were predictive of different categories of stress. Irregular or unpredictable styles of daily habits (i.e., Rhythmicity) were associated with increases in perceptions of stress related to daily hassles and affective-anxiety. Also unstable daily habits and higher levels of motor activity (i.e., Activity-General) were related to increases in daily hassles type stress. The different predictive temperament attributes for the criterion stress categories were

viewed as support not only for the second hypothesis, but also for an interactive relationship existing between temperament and stress.

The final hypothesis focused on the relationships among stress, temperament, and achievement. Four structural models were assessed using the EQS program. The results showed that Mood and Attention Span/Distractibility did not successfully mediate perceptions of stress. However, Rhythmicity was found to mediate the relationship between some affect-based type stressors and academic achievement. Finally, the analyses supported the use of a more parsimonious model when assessing the mediating relationship of temperament. The importance of Rhythmicity in children's perceptions of stress was one of the educational implications that emerged.

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CHAPTER I

Statement of the Problem

This study examined the relationship among stress, temperament, and academic achievement in middle-school children. Previous research has examined each of these variables singularly and in varying dual combinations. However, to date, there have been no known studies that have linked these three variables together or hypothesized about a relationship existing among them. The present research project was designed as an initial exploration of these three variables, with the goal of increasing the level of understanding about their potential interaction.

Stress and stress-related behaviors in adults have been studied for over half a century. However, it has only been during the past two decades that researchers have started to address the issue of stress in children. Research has shown that various types of stressors and stressful environments can adversely affect children (Chandler, 1985; D'Aurora & Fimian, 1988; Omizo, Omizo, & Suzuki, 1988; Sandler & Block, 1979; Wertlieb, Weigel, & Feldstein, 1987). Researchers have found that as the age of the child increases, so do the number of stressful life events that the child has experienced (Chandler, Million, & Shermis, 1985; Yamamoto & Davis, 1982).

The fact that stress and stressful environments influence children makes this area of research important to the field of education. Excessive or prolonged stress can strain a child's resources and affect school performance (Chandler, 1985; D'Aurora, & Fimian, 1988). Even low levels of continued stress, whether due to familial or school environmental factors, can influence a child's ability to function academically (D'Aurora & Fimian, 1988; Humphrey, 1988). There is evidence that a negative relationship exists between stress and the academic performance of children, with an increase in the frequency of

stressful life events experienced by children being associated with lower ratings of academic achievement (Humphrey, 1988). In a study by Sandler and Block (1979), inner city elementary school children, identified by their teachers as experiencing behavioral adjustment problems, had more stressful experiences in the preceding year than a matched sample of normal comparison children.

In a discussion on childhood stress, several stressors were identified as precipitating the onset of behavioral difficulties and academic problems in children, including: child abuse, lower social economic class, and parental discord or divorce (Honig, 1986). Research on childhood stress is still in its early stages of development. There are many areas that need further investigation to help to clarify the role that stress plays in the lives of children.

A number of variables need to be considered in studying stress, one of which is temperament. Temperament has long been thought of as a relatively stable set of traits, of a genetic or congenital origin, that are believed to mediate the influences of the environment (Martin, 1983). More recently researchers have begun to view temperament as a multidimensional construct. Specifically, the construct of temperament is thought to represent the behavioral manifestations of biologically-influenced processes that are important in determining an individual's overall style of initiating behavior and responding to the environment (Goldsmith & Rieser-Danner, 1990). Different behavioral responses of individuals to the same environmental stimulus are, in part, believed to be due to temperamental variables (Goldsmith, Buss, Plomin, Rothbart, Thomas, Chess, Hinde, & McCall, 1987). Rutter (1988) acknowledges that temperament is one of the characteristics a child brings to a stressful interaction. He also notes that the field is lacking in studies

focusing on the role of temperament in children's reactions to stress (Rutter, 1988). In one study that did address the topic of stress and temperament, temperament was found to be a moderating influence on children's behavioral responses to stress (Wertlieb, Weigel, Springer, & Feldstein, 1987).

With society's increased mobility and associated population shifts, the supportive networks provided by local neighborhoods and the extended family have been reduced dramatically (Meyers, 1988). As a result, it is expected that schools will start seeing increasing numbers of children suffering from stress-related symptoms. Information and empirical data on how stress and temperament interact and are related to the academic performance of children could assist schools in providing optimal educational experiences to students. Additionally, such research results could yield beneficial information for planning intervention strategies for reducing the impact of stress on children.

Current Objectives

With the goal of trying to increase the level of understanding of the interplay of these three variables, this study focused on the relationships among stress, temperament, and academic achievement. This was accomplished through a series of analytic procedures aimed at addressing the following questions: (1) What are the various types of stressors perceived by children, and how are they related to academic achievement? (2) What temperamental variables are related to children's perceived stress? and (3) To what degree does temperament mediate the relationship between stress and academic achievement in middle school children?

CHAPTER II

Background Theory and Research

Definition of Stress

Due to the increasingly complex nature of contemporary American society, stressful experiences are rapidly becoming a part of everyday life. The demands of family relationships, social interactions, financial responsibilities, and community or religious commitments are but a few of the possible sources of stress that can impact on adults, as well as adolescents and children. It is generally accepted that most individuals will experience some degree of stress at some time in their life. Consequently stress and its effects have become commonplace, with the majority of adults being able to identify stressful situations or events and their associated consequences. Additionally, research has shown that children as young as six years old are sufficiently aware of their own stressors and can report conditions and events that they find stressful (Band & Weitz, 1988). The pervasiveness of the stressful experience across many domains and developmental levels has made stress a popular topic of discussion and research in the field of psychology. However, the study of stress and the ways in which stress can affect an individual is a more problematic task than it first appears. Although stress is typically identified as a common occurrence within the general population, investigators trying to conduct research on stress are frequently confronted with a variety of problems that can negatively affect their work. One of the major dilemmas faced by researchers is that frequently the concept of stress is elusive to procedures of scientific investigation.

The problems that exist in studying stress are easily recognized by researchers, who are confronted with the irony that although stress is easy to

describe, it is difficult to define. Over time different stress researchers have used similar sets of characteristics in constructing their own concept of stress. However, the use of a shared set of features has not prevented the emergence of several different formal concepts of stress and subsequently different viewpoints on the definition of stress. Rutter (1988) states that stress lacks any agreed upon definition and that a number of different perspectives can be equally applied to the concept of stress. After several decades of stress research, it is acknowledged that stress has no agreed upon definition. Stress can be described as a stimulus condition, behavioral response, or interactional process. In their discussion on the directions of stress research, Breznitz and Goldberger (1982) noted that researchers often adopt a definition of stress that is best suited to their area of interest.

Lazarus and Launier (1978) view stress as occurring from an imbalance between environmental demands and the individual's ability to cope with these demands. Whether or not stress occurs will depend on the characteristics of the individual, and the impact of these characteristics on the appraisal of the environmental event. For example, if the individual characteristically underestimates the availability of resources, there is an increased chance for stress, as the demands of the environment will consistently be perceived as overwhelming. This interactional model for stress allows for differences in how an individual responds to potentially stressful environmental events. This model can be summarized by the formula:

$$S = M (D - C)$$

That is, the degree of stress experienced (S) is equal to the quantity of difference between environmental demands (D) and the ability of the individual to cope (C), multiplied by the motivation (M), or investment, that

the individual has in the outcome (Crider, Goethals, Kavanaugh, & Solomon, 1986). Although the model for stress outlined by this formula aligns with the interactional hypothesis (i.e., that stress results from the interaction of the individual with the environment), for this study the concept of stress was defined by the environmental events that were demanding (D). Specifically, it was children's perceptions of the degree or intensity of the environmental demands that was used to define stress.

Although stress can originate from a variety of sources, the various stressful environmental events experienced by children have been classified into two main categories: life events and daily hassles. Life events are those major life experiences that can influence a child, such as parental divorce, birth of a sibling, and relocation to a new home (Yamamoto, 1979). Daily hassles are the irritating, frustrating, and demanding environmental events that are less severe in impact, but are a part of everyday life (Kanner, Cayne, Schaefer, & Lazarus, 1981). Some examples of daily hassles for children are time pressures, family expectations, and pressure from friends and classmates to conform. Although early researchers tended to focus mainly on life events as the sources of stress for children (Coddington, 1971; Sandler & Ramsay, 1980), more recently researchers also have included daily hassles in the list of stressors experienced by children (Colton, 1985; Dise-Lewis, 1988; Elwood, 1987).

Assessment of Stress

Researchers repeatedly have documented the various methodological problems associated with assessing both types of stressors (Colton, 1985; Dohrenwend, 1973; Dohrenwend, Dohrenwend, Dodson, & Shrout, 1984; Elwood, 1987; Karr & Johnson, 1987; Yamamoto & Felsenthal, 1982). An additional

problem for investigations of childhood stress is the lack of reliable and valid stress measures specifically designed for children (Karr & Johnson, 1987). The most frequently used measure for assessing children's stress has been the parent or teacher rating method (Coddington, 1972; Karr & Johnson, 1987). However, this method of assessing stress in children was developed by adults and has been criticized for its tendency to reflect adult perceptions, more than the perceptions of children (Elwood, 1987; Yamamoto & Felsenthal, 1982). In a study where the stressfulness of 20 childhood events was rated by three adult groups and then compared to children's ratings of the same events, a lower correlation of .68 was obtained for the children and adult ratings, as compared to correlations of .90 and above obtained for the ratings of the three adult groups (Yamamoto & Felsenthal, 1982). In her study, Colton (1985) found that professionals tended to underestimate the severity of stressors for children, and this prompted her to recommend that adult ratings should not be used to assess stress in children unless they are accompanied by the perceptions of children.

Yamamoto (1979) argued that it is possible to construct a meaningful life-events scale for children by using the input of children. Research data have shown that children can assess the amount of stressfulness in different life events (Yamamoto, 1979; Yamamoto & Byrnes, 1987; Yamamoto & Davis, 1982). Several stress measures have been developed using children's perceptions and these measures have proven to be valid representations of childhood stress (Colton, 1985; Dise-Lewis, 1988; Elwood, 1987; Yamamoto, 1979; Yamamoto & Byrnes, 1987).

The availability of more representative measures for childhood stress has helped to advance the research on stress in children. Even these child-focused stress measures are limited, however, because they fail to take into

account the characteristics of the child that actively contribute to their perceptions of the stressful experience. Returning to the definition of stress presented by Lazarus and Launier (1978), it is noted that their concept of stress does include characteristics, or traits, of the individual (i.e., child). Again, it is these traits that are considered primary in determining to what degree (if any) the environment will be perceived as stressful. Thus, it is not only the external environmental event that must be considered in studying, or measuring, childhood stress, but also the traits of the child. Following the interactional model for stress, Rutter (1988) also has acknowledged that the traits of children are important variables in determining the stressfulness of environmental events. Furthermore, he identified temperament as one of the important characteristics that a child brings to a stress reaction (Rutter, 1988). In one study that did address the topic of stress and temperament, temperament was found to be a moderating influence on children's behavioral responses to stress (Wertlieb, Weigel, Springer, & Feldstein, 1987).

Stress and Temperament

If temperament does influence a child's ability to successfully handle stress, then it is necessary to examine the concept of temperament in more detail prior to exploring the relationship between these two variables. As previously stated, researchers view temperament as a multidimensional construct that is important in determining an individual's overall style of initiating behavior and responding to the environment (Goldsmith & Rieser-Danner, 1990). A pioneering study that made significant empirical and theoretical contributions to temperament research was the The New York Longitudinal Study (NYLS), which followed the behavioral development of 133 participants from early infancy to early adulthood (Thomas, Chess, & Birch, 1968). The most

well-known outcome of this study was the identification of nine temperament characteristics: Activity, Rhythmicity, Approach/Withdrawal, Adaptability, Intensity of Reaction, Threshold of Responsiveness, Mood, Distractibility, and Attention Span, which clustered in three distinct constellations: the easy child, the slow-to-warm-up child, and the difficult child (Thomas, Chess, & Birch, 1968). A brief description of each of the temperament dimensions can be found in Appendix A.

Since the NYLS, other researchers have identified similar temperamental variables (Baker, 1984; Keogh, Pullis, & Cadwell, 1982; McDevitt & Carey, 1977; Mook, 1988; Paget, Nagle, & Martin, 1984; Pullis & Cadwell, 1982; Windle & Lerner, 1986). In an overview of the temperament measures based on the original nine categories of the NYLS, Goldsmith and Rieser-Danner (1990) noted that similarities exist among the emerging temperament factors. However, it was also noted that few of the emerging factors, or temperament characteristics, across the measures were relatively pure in their correspondence to the NYLS dimensions. The thematic content of the factors, however, were similar to the NYLS and, in fact, in some instances were composites of the NYLS dimensions. Furthermore, Goldsmith and Rieser-Danner (1990) stated:

> "...investigators must recognize that item-based factor analyses have generally suggested that the temperament domain should be parsed somewhat different than in the nine NYLS dimensions. They must also recognize that factor analyses of scales generally suggest fewer than nine independent dimensions" (p. 256).

Besides there being differences across the specific temperament dimensions, differences have also been found in the three clusters of temperament constellations originally identified in the NYLS. Emotionality, Persistence, and Sociability were the factors identified by Martin (1988) in his analysis of the temperament variables of the Temperament Assessment

Battery. Buss and Plomin named three similar factors (i.e., Activity, Sociability, and Emotionality) in their research on temperament (Goldsmith et al., 1987). In an investigation of the Student Personality Assessment Form, a teacher rating scale for temperament, Baker (1984) also found three well-defined temperament factors which he named: Compliance, Interpersonal Affect, and Extroversion. Despite the labeling differences, however, the three cluster solution remains consistent.

The NYLS also revealed the importance of a child's temperamental style in responding to a given environmental event (Thomas & Chess, 1986). The comparison of the child's temperamental characteristics to the characteristics of the environment has been referred to by researchers as the "goodness-of-fit" model (Goldsmith et al., 1987; Keogh, 1989; Thomas & Chess, 1986). Rutter (1988) noted the lack of research on the relationship of temperamental styles to children's reactions to stressful situations. In one study that did analyze temperament and stress in children, several significant relationships were found (Wertlieb, Weigel, Springer, & Feldstein, 1987). Similar to the results of previous studies, this study showed that higher levels of stress were associated with an increase in behavioral symptoms. Additionally, the study revealed that eight of the nine temperament dimensions assessed had significant relationships (percentages ranged from 6% to 32% of the shared variance) with the behavioral symptomology. More specific to the relationship of stress and temperament were the findings that the temperament traits of Adaptability, Intensity, Distractibility, Threshold, and Approach were found to interact significantly with stress.

The Relationship Among Stress, Temperament, and Achievement

As noted in the introduction of this dissertation, excessive or prolonged stress has been shown to affect a child's school performance (Chandler, 1985; D'Aurora, & Fimian, 1988). Even low levels of continued stress, whether due to familial or school environmental factors, can influence a child's ability to function academically (D'Aurora & Fimian, 1988; Humphrey, 1988). Researchers examining how stress influences children's school performance have found that a negative relationship does exist between stress and the academic performance of children, with an increase in the frequency of stressful life events experienced by children being associated with lower ratings of academic achievement (Humphrey, 1988).

Research also supports an association between temperament and the classroom behaviors that are related to achievement (Carey, Fox, & McDevitt, 1977; Chess, 1968; Keogh, 1989; Keogh, 1986; Martin, 1989; Martin, Nagle, & Paget, 1983; Paget, Nagle, & Martin, 1984). Chess (1968) acknowledged the existence of a relationship between a child's temperamental characteristics and classroom behavior, noting that the manner in which the child approaches the learning task, as well as his/her interactions with the teacher and other children, influences school performance. In a study of temperament, school performance, and classroom management decisions, Pullis and Cadwell (1982) found that a child's temperamental qualities had a consistent influence on teacher decisions about classroom management. Furthermore, the study revealed that the temperamental trait of adaptability was significantly related to academic achievement.

Other researchers studying the interaction between temperament and school performance have also discovered that specific temperamental traits are related to academic achievement. Keogh (1989) noted that adaptability and

activity level are two temperament dimensions that are related to educational achievement across studies. Carey, Fox, and McDevitt (1977) studied the temperamental ratings of 51 children and concluded that temperament is a factor in early school adjustment, with the children rated lower in adaptability having more trouble in problem solving and scholastic achievement. In a study of learning-disabled students and underachievers, Martin (1989) found that, in general, distractibility, persistence, and activity were correlated more strongly with achievement than the other temperament characteristics.

A Model for the Relationship of Stress, Temperament, and Achievement

The preceding discussion has documented that a variety of different relationships exist among the three variables of stress, temperament, and academic achievement. To summarize, first, research shows that stressful life events can adversely affect the lives of children, including their academic performance. Second, it is documented that temperament has a role in children's stress reactions. That is, temperamental style may be a determinant in how children respond to stress. Finally, research on the relationships that stress and temperament, as individual variables, have with academic achievement was presented. With support having been provided for dual relationships between the different variables, only the relationship of all three of these variables combined needs to be explored. In line with the main hypothesis of this study, it is argued that relationship of stress and academic achievement will be mediated by temperament. This argument can be tested using structural modeling procedures.

Structural modeling analysis allows for the testing of an overall theoretical model of non-experimental correlational data in a path analysis framework (Bentler, 1989). It is the hypothesized relationships between the unmeasured

latent factors (i.e., the variables of stress, temperament, and achievement) that are tested for their "goodness-of-fit." One of the benefits of structural modeling is that it allows for the examination of both direct and indirect effects, the later being those occurring through a mediating variable. A model for the hypothesis, that the relationship between stress and achievement is mediated through temperament, is illustrated in Figure 1.

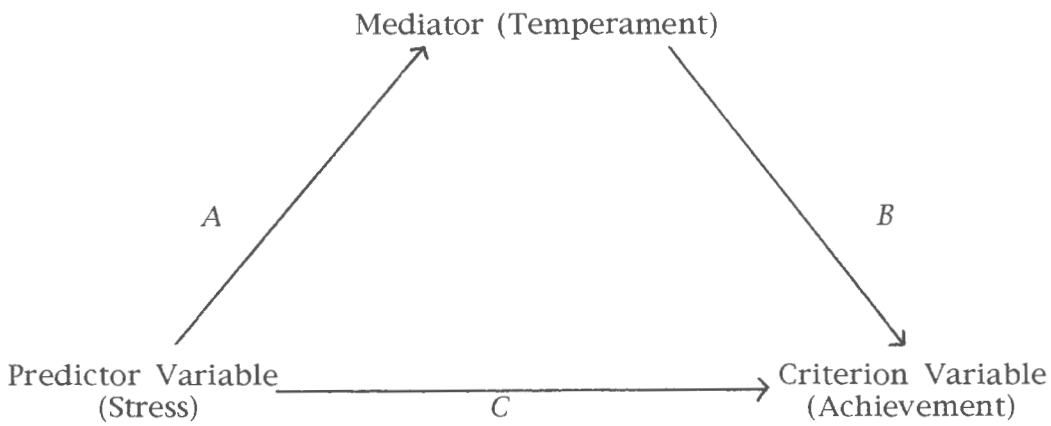


Figure 1. Mediation model for the variables of stress, temperament, and achievement*

*Adapted from Baron and Kenny (1986)

The model presented in Figure 1 is based on a three-variable system as outlined in Baron and Kenny's (1986) discussion on the nature of mediating variables. The three-variable system assumes that there are two causal paths feeding into the criterion variable of achievement. Path C is the direct path for the predictor variable of stress to the criterion variable of achievement. The indirect path is the combination of Path A with Path B, which illustrates how the predictor variable of stress is mediated by temperament, prior to impacting on the criterion variable. A review of the above model for mediating variables, in conjunction with the basic tenets of the structural

modeling approach, supports the selection of this analytic procedure for studying the relationship between the variables of stress, temperament, and academic achievement.

Summary

Although there is a lack of studies linking all three variables, stress, temperament, and academic achievement, there is support for a relationship existing among them. This linkage is suggested by the documented relationship that stress and temperament individually have with a number of academic-related behaviors. Additionally, some support exists for the role of temperament as a mediator for stress in children.

Logically, the next step in the research of childhood stress is an examination of the interactional nature of these three variables. Such an investigation could prove to be beneficial to the field of education, because the research results could increase our understanding of the stress-related factors influencing learning. With this idea in mind, this study focused on the relationship among stress, temperament, and academic achievement. It is hypothesized that: (1) the various types of life events perceived as stressful by children differ in their relationship with academic achievement, (2) the temperamental variables differ in their relationship with children's perceived stressors, and (3) temperament mediates the relationship of stress and academic achievement.

CHAPTER III

Method

Subjects

The participants in this study were sixth grade students from three public school districts in Rhode Island. The participating school districts were selected using the population listings in The Education Indicators Report on the Condition of Education: The State and Public Schools of Rhode Island (1991). Based on their population, each city, or town, in Rhode Island was categorized as being an urban, suburban, or rural area. School districts from each of these three categories were then invited to participate in the study. Out of the ten school districts contacted by the examiner, three school systems, two suburban and one rural, agreed to be involved in the study for the 1992 Spring term. One urban school district also expressed interest in the study. However, the lateness of their response precluded their involvement. The student population in the participating schools derived predominantly from white, middle class families with median incomes of $20,284 and $21,048 for the two suburban school districts, and $22,127 for the rural school district.

A total of 263 children took part in the study, with there being a fairly even representation of males (N=129) and females (N=134). The mean age was 11.5 years with a standard deviation of .617 years.

This study was reviewed and approved by the Institutional Review Board at the University of Rhode Island. In accordance with their recommended guidelines, proper consents (Appendix B) were obtained for all participants and responses on the questionnaires were kept confidential. Additionally, during the administration of the questionnaires, all subjects were informed of their right to withdraw from participation.

Instruments

Two self-report measures of stress and one self-rating temperament measure were used as predictor variables in this study. The self-report measures of stress were the Children's Own Perceptions and Experiences of Stressors (COPES) (Colton, 1985) and "How Do You Feel?" (Yamamoto, 1979). The self-rating scale was the Revised Dimensions of Temperament Survey (DOTS-R) (Windle & Lerner, 1986). The criterion variable for the study was the Metropolitan Achievement Tests for the 1991-1992 academic year.

Children's Own Perceptions and Experiences of Stressors (COPES). The Children's Own Perceptions and Experiences of Stressors (COPES) (Colton, 1985) is a 60-item questionnaire that requires children to rate how upsetting different life events are using a 5-point scale (1 being the least upsetting and 5 being the most upsetting). After completing the ratings of stressfulness, the children then are required to indicate whether or not they have ever experienced the 60 different life events by circling either "Yes" or "No." If the children circle "Yes," that they have experienced a particular life event, then they are also asked to indicate whether the life event was upsetting to them. The items included on the COPES were obtained from several sources (i.e., review of literature and existing inventories, interviews with children) to ensure that no potential stressors for children were overlooked. The original factor analysis of the COPES (N=181) by Colton (1985) yielded seven interpretable factors that accounted for 44.5% of the cumulative factor variance. Internal consistencies for the individual factors were calculated using Cronbach's alpha coefficient. The range of the coefficients spanned .71 to .96, with an median of .87 for the stress factors.

Fifty-four of the original sixty items on the COPES scale were retained for this study (Appendix C). Two of the items ["Physical child abuse (getting

beaten)" and "Living with a parent you're not happy with (if your parents are divorced)"] were omitted from the scale due to their sensitive nature, which was found to be objectionable to several of the school districts. Additionally, four of the original items were slightly modified to reduce the risk of anxiousness in the participants (e.g., "Use of alcohol by you, your parents, or your friends" was changed to "Someone you know uses alcohol"). It was believed that these modifications would not affect the outcome of this study, as the primary content of each of the altered items was retained.

"How Do You Feel?". The second stress measure, "How Do You Feel?" (Yamamoto, 1979), is a 20-item questionnaire (Appendix D) requiring children to rate how upset they would feel about 20 undesirable life-events using a 7-point scale (1 being the least upsetting and 7 being the most upsetting). The children also are required to indicate whether they have experienced the different life-events by circling either "Yes" or "No." Test-retest reliability coefficients for this stress measure have been shown to be moderate across a two month interval for both stress ratings and personal experiences (.46 and .57, respectively) (Yamamoto, 1979). In a study that used the "How Do You Feel?" measure with children living in diverse areas (i.e., urban, suburban, rural) in the Southwest, high correlations (r=.97 or greater) were found across children's ratings of stressful events (Yamamoto & Byrnes, 1987). Thus, there is support for the use of this stress measure across different population settings. In a cross-cultural study (N=1814), there was a high degree of convergence on the ratings of stressful events (i.e., all groups placed the same five events towards the stressful end of the scale) by children from six nations (Yamamoto, Soliman, Parsons, & Davies, 1987). The intracultural correlations for the entire scale in this study ranged from .70 to .98, with a median of .88. Finally, Yamamoto and Byrnes (1987) found high correlations between the

standardized mean ratings of first and third graders (r=.94); first and sixth graders (r=.81); and third and sixth graders (r=.89), which supports the use of this scale across age groups.

Revised Dimensions of Temperament Survey(DOTS-R). The Revised Dimensions of Temperament Survey (Windle & Lerner, 1986), is a 56-item scale (Appendix E) that requires children to rate their own temperament, or behavioral style, by answering questions about how they behave. On this self-rating scale, the children indicate whether a specified behavior is: (a) usually false, (b) more false than true, (c) more true than false, or (d) usually true. Scoring of the DOTS-R involves summing the items representing each temperament attribute to form seven attribute scores. Higher scores on each of the DOTS-R subscales (i.e., attributes) is indicative of higher levels of the corresponding attribute, or temperament dimension. For example, a high score on mood is indicative of a temperamental style that is generally more positive (i.e., agreeable) in mood.

The Revised Dimensions of Temperament Survey is reported to be the most comprehensive in its analysis of the original content pool of the New York Longitudinal Study (Goldsmith & Rieser-Danner, 1990). The original 117 items for DOTS-R were assessed for interrater agreement regarding the content validity of items. Expert raters classified items according to the nine temperament categories proposed by Thomas and Chess in the New York Longitudinal Study. Results showed a 97% agreement occurring across raters (Windle & Lerner, 1986). The remaining 106 items were assessed for similarities in covariance patterns across age groups. Items found not to contribute to increased reliability across three age groups were deleted. An orthogonal factor analysis (N=489), conducted on the remaining 80 items, revealed a nine factor solution for the temperament data. Moderate to high

levels of internal consistency, as measured by Cronbach's alpha, were found across the temperament dimensions, with coefficients ranging from .54 to .81 with a median of .79. Test-retest stability coefficients across a six-week interval averaged .67 for the temperament attributes (Windle, Hooker, Lenerz, East, Lerner, & Lerner, 1986).

Fifty-two of the original fifty-four items on the DOTS-R scale were retained for this study. Two of the items ("I have bowel movements about the same time each day." and "The number of times I have a bowel movement on any day varies from day to day.") were omitted from the scale due to their personal nature, which was found to be objectionable by several school districts. Although both of the deleted items are scored on the same dimension (i.e., Rhythmicity-Daily Habits), by combining the three Rhythmicity dimensions in scoring (i.e., Rhythmicity-Daily Habits, Rhythmicity-Eating, and Rhythmicity-Sleep) it was argued that the reliability of the combined dimensions would be retained (M. Windle, personal communication, April 7, 1992).

Metropolitan Achievement Tests (MAT). The criterion measure for the study was the Metropolitan Achievement Tests, administered by the respective school districts, for the 1991-1992 academic year. Three subtest scores (i.e., Reading, Mathematics, and Language) and the total score (i.e., Basic Battery) were obtained from each of the children's records after the administration of the predictor measures. Each of the subscale scores (i.e., subtest scores) is composed of skill areas directly related to that particular content area (e.g., at the elementary level the Reading subscale is made up of items in vocabulary, word recognition skills, and reading comprehension). The Basic Battery score includes three of the five content areas tested (Reading, Language, and Mathematics), omitting Science and Social Studies (Anastasi, 1988).

The Metropolitan Achievement Tests is a widely used survey test battery that is well normed and validated (Mitchell, 1985). The standardization program for the 1985 MAT involved over 250,00 students which closely resembled the national school population in size of school system, geographical location, socioeconomic status, and ethnic background (Anastasi, 1988). The Kuder-Richardson reliability estimates for the MAT subtests are all over .80, with most tests being over .90 (Haertel, 1978). The procedures used to establish the content validity of the MAT included an analysis of educational materials (e.g,, textbooks, syllabuses, and state guidelines) for development of items, empirical item tryouts on national samples, and review by a panel of educators (Anastasi, 1988). Even though the content of the MAT must be viewed in relation to the curriculum of the schools, the item validity has been shown to be good (Linn, 1978).

Procedure

The subjects were administered the three predictor variables in group format during school hours by the principal investigator and her assistants. Group size for the administration of the measures ranged from 21 to 90 students. Before the instruments were administered, students were told that the questionnaires were part of a research study. They were also informed that their responses were confidential and that they were free to withdraw from the study at any time. A prepared set of instructions was included for each of the measures. These written instructions, which are at the beginning of each of the respective measures (Appendixes C, D, and E), were read to all groups, with sample items being used to demonstrate each of the measures. Additionally, the concept of "stress" was defined to all groups as, "the things, or events, that may upset you," to ensure that all the subjects were using the

same criteria for rating the stressfulness of the questionnaire items. The subjects completed the three questionnaires independently, however, within the established group format, all the subjects worked on the same questionnaire at the same time. Children needing to have items read to them, certain words defined, or clarification were given the necessary assistance. It took approximately 45 minutes for the subjects to complete all three questionnaires.

Research Model

The theoretical structural model for the relationship among stress, temperament, and academic achievement is shown in Figure 2. The structural model for the relationship of these three variables is based on Baron and Kenny's (1986) Mediation Model. Basically the model presents that stress has both a direct effect on achievement and an indirect effect on achievement through the mediating variable of temperament. The large circles in the model represent the latent (i.e., unmeasured) constructs and the squares represent the observed, or measured, variables. The single headed arrows from the circles to the squares indicate that the observed variables are theorized to be generated from their respective latent constructs. The plus and minus signs on the paths between the variables and latent constructs represent the hypothesized direction of their relationship. In the model, the error of measurements for the observed variables and the prediction residuals for the latent constructs are represented by E and D, respectively.

The latent constructs of stress and temperament, along with their measured variables, were extracted from the data analysis conducted for the first two parts of this study. In the first part of this study, the two self-report stress measures were analyzed for their underlying component structure. The

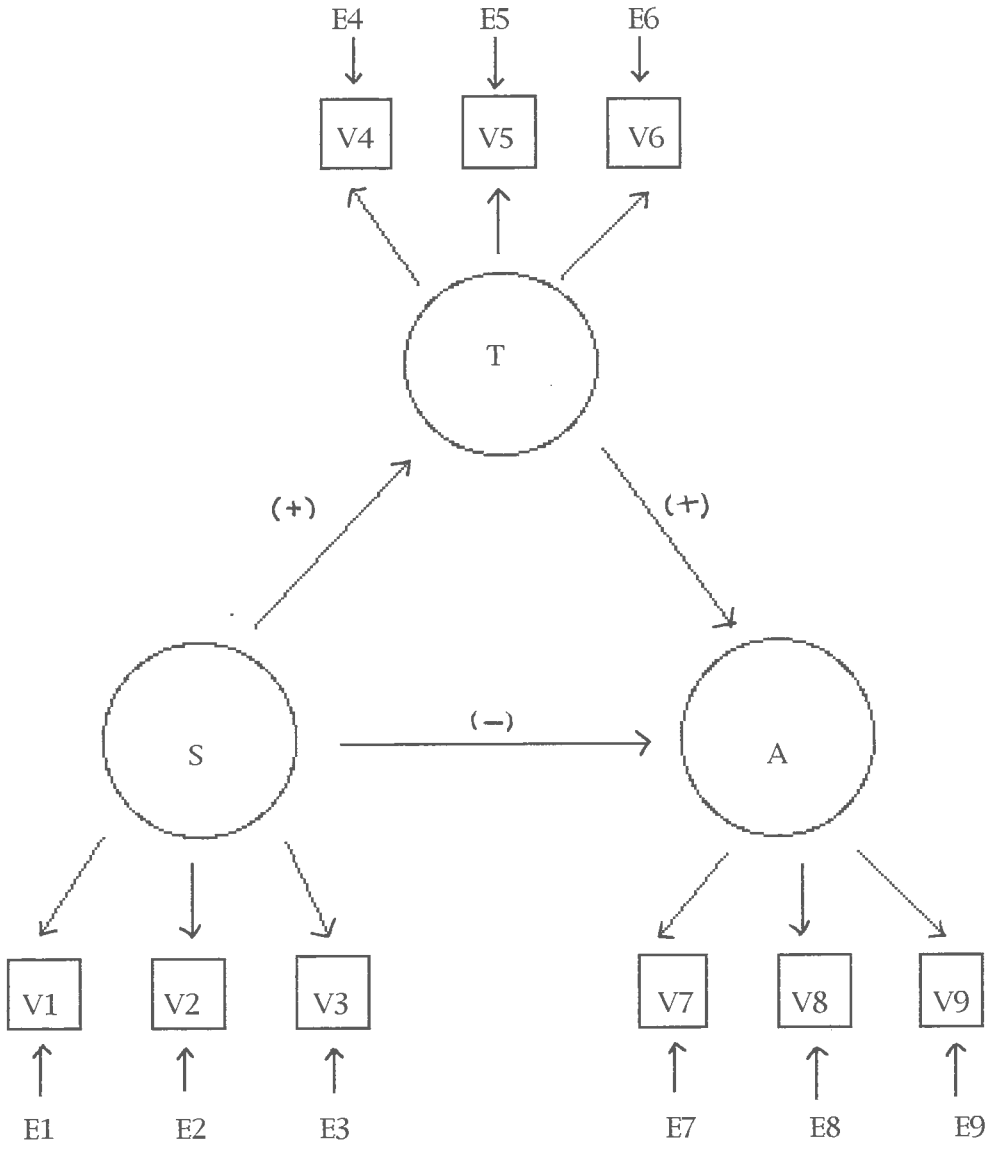


Figure 2. The theoretical structural model for the variables of stress, temperament, and achievement

S=Stress, T=Temperament, A=Achievement

V=measured variables, E=error of measurement, D=prediction residual

emerging stress components were then entered in a multiple regression procedure to determine how well they predicted achievement. The significant stress predictors were retained as latent constructs for the structural model. Similar analytic procedures were followed in the second part of this study in order to obtain the latent constructs for temperament. For the criterion variable, achievement, the subtest scores (i.e., Reading, Mathematics, and Language) from the Metropolitan Achievement Tests were used as the observed variables for the latent construct. It was believed that the preliminary analyses in the first two parts of this study would identify those components that did not contribute significantly to the hypothesized model, and that the elimination of these components would improve the overall fit of the model.

Considering that it was likely that more than one stress component and more than one temperament component would be retained as latent constructs, several models were tested. This allowed for the identification of those components that best fit the theoretical structural model. The theoretical models were assessed using the EQS program (Bentler, 1989). A variety of statistics generated from the program were used to assess the adequacy of the structural models. Specifically, the chi-square goodness-of-fit test, the Comparative Fit Index (CFI), and the Absolute Standardized Residuals were utilized.

CHAPTER IV

Results

Prior to starting the analysis, the data were examined for accuracy through the use of random checks and screening for outliers. The data file was then assessed for missing data. Less than 1% of the data was missing. The missing data for the continuous variables in the study were replaced with the calculated mean values for each item.

The results of the analysis are presented in three parts. Part One reports the analytic procedures used on the two self-report stress measures, COPES and "How Do You Feel?." Additionally, the regression procedures employed to determine the relationship of stress and academic achievement, are also presented in this section. Part Two details the analytic procedures used on the self-rating temperament measure, along with the subsequent analysis of the temperament components as predictors for the categories of stress. Part Three is a series of structural models that tested the goodness-of-fit for the hypothesis that temperament mediates the relationship of stress and academic achievement.

Part One

For the first hypothesis, the two self-report stress measures were examined to determine whether there were specific categories, or components, representative of children's stress. Prior to the analysis, the internal consistency ratings of the two self-report measures of stress COPES and "How Do You Feel?" were assessed using Cronbach's alpha. The results showed relatively strong consistency ratings of .95 and .85, respectively, for the two stress measures. Analytic procedures were then employed to determine the

underlying structure of the two stress measures. It should be noted that the data on whether or not the children had experienced the different life events (i.e., yes or no section of the stress measures) were not included in this analysis. The children's reports of which life events they had experienced was beyond the scope of this study and will be used in future analyses.

A principal components analysis (PCA), Varimax rotation, was used on the Children's Own Perceptions and Experiences of Stress (COPES), which revealed a fourteen component solution that accounted for 62% of the total variance. Using the criteria set by Zwick and Velicer (1986), that (1) eigenvalues for the unrotated components be 1.0 or greater; (2) that each component should retain at least three component loadings of .40 or greater; and (3) that the resulting components should make psychological sense in terms of coverage of the data, the COPES scale yielded seven interpretable components which accounted for 47.4% of the total variance. The seven components and their loadings can be found in Table 1. Internal consistency coefficients, calculated for each of the seven components, ranged from .73 to .90, with a median of .77. After a review of the types of life events loading on each of the components, the seven components were named: Affective, Major Life Events, Daily Hassles, Family Isolation, School, Interpersonal, Families-Step. The seven component solution appears to be an accurate representation of the types, or categories, of stressful situations experienced by children.

Similarities were noted between the component structure of the COPES (1985) obtained in this study and the component structure obtained by Colton. For example, the Affective, Interpersonal, and Daily Hassles components emerging from this analysis closely resemble three of the components (i.e, the Isolation, Family Disruption, and Cognitive Overload components) from Colton's analysis. Specifically, it is the clustering of the individual variables, or items

Table 1.

Principal Component Loadings for the
Children's Own Perceptions and Experiences of Stress (COPES)

	Stress Component Loadings						
Item	S1	S2	S3	S4	S5	S6	S7
55. People take advantage	.64	*	*	*	*	*	*
38. Being ignored	.58	*	*	*	*	*	*
41. Needing help in school	.56	*	*	*	*	*	*
42. Being betrayed	.51	.42	*	*	*	*	*
27. Trouble with school	.50	*	*	*	*	*	*
33. Parent worried	.50	*	*	*	*	*	*
58. Not able to perform	.48	*	*	*	*	*	*
44. Truth, but not believed	.46	*	*	*	*	*	*
46. Caught stealing	.45	*	*	*	.49	*	*
49. Getting punished	.44	*	*	*	*	*	*
50. Being compared	.44	*	*	*	*	*	*
40. Being laughed at	.43	*	*	*	*	.52	*
31. Being disappointed	.41	*	*	*	*	*	*
45. Being lonely	.41	*	*	*	*	*	*
17. Use of alcohol	*	.62	*	*	*	*	*
37. Parents separating	*	.59	*	*	*	.43	.40
39. Divorce of parents	*	.57	*	*	*	.46	*
12. Parent loses job	*	.55	*	*	*	*	*
57. Drug use	*	.54	*	*	*	*	*
09. Moving	*	.54	*	*	*	*	*
26. Fights with parents	*	.51	*	*	*	*	*
30. Choosing parent	*	.48	*	*	*	*	*
53. Someone dies	*	.46	*	*	*	*	*
18. Someone in hospital	*	.42	*	*	*	*	*
13. Too much homework	*	*	.68	*	*	*	*
20. Not allowed	*	*	.54	*	*	*	*
07. Not enough money	*	*	.53	*	*	*	*
11. Too many things to do	*	*	.52	*	*	*	*
21. Getting blamed	*	*	.49	*	*	.46	*
34. Being interrupted	*	*	.45	*	*	*	*
08. Embarrassed	*	*	.44	*	*	*	*
29. Not getting approval	*	*	.43	*	*	*	*
16. Mother works	*	*	*	.66	*	*	*
52. Being alone in house	*	*	*	.60	*	*	*
32. Fighting	*	*	*	.54	*	*	*
36. Problems with siblings	*	*	*	.50	*	*	*
19. Problems older siblings	*	*	*	.47	*	*	*
51. Hearing parents fight	*	*	*	.43	*	*	*
04. Getting in trouble	*	*	*	*	.65	*	*
02. Suspended	*	*	*	*	.64	*	*
43. Poor grades	*	*	*	*	.52	*	*

Table 1. (continued)

Principal Components Loadings for the
Children's Own Perceptions and Experiences of Stress (COPES)

	Stress Component Loadings						
Item	S1	S2	S3	S4	S5	S6	S7
14. Teacher yells	*	*	*	*	.51	*	*
47. Pet runs away	*	*	*	*	.43	*	*
01. Nobody likes you	*	*	*	*	*	.57	*
03. Thoughts of death	*	*	*	*	*	.56	*
35. Concerns about looks	*	*	*	*	*	.41	*
28. Meet step-siblings	*	*	*	*	*	*	.64
25. Marriage of parent	*	*	*	*	*	*	.60
48. Get along step-siblings	*	*	*	*	*	*	.49
23. Knowing who to trust	*	*	*	*	*	*	.49
Internal Consistency	.90	.85	.78	.75	.78	.77	.73

* All component loadings less than .40 are eliminated from the table
S1=Affective, S2=Major Life Events, S3=Daily Hassles, S4=Family Isolation, S5=School, S6=Interpersonal, S7=Families-Step

on the components that are similar. Additionally, three of the components obtained by Colton (i.e., Major Life Events, School Problems, and Step-Families) were also obtained in the analysis for this study. There were two components, Financial Concerns from Colton's analysis and Family Isolation from the current analysis that emerged only in their respective studies. Despite the noted differences, the above-mentioned similarities support a seven component solution of the COPES as being representative of the types of stressful life events experienced by children.

A principal components analysis (PCA) was also conducted on the "How Do You Feel?" scale. The principal components analysis, Varimax rotation, yielded four interpretable components that accounted for 50.4% of the total variance. Two of the items (i.e., "Getting lost in some strange place" and "Getting up in front of the class to give a report") did not load significantly on any of the

components. This resulted in a decision to eliminate these items for this stage of the analysis. The four components and their loadings can be found in Table 2. The internal consistency coefficients, calculated for each of the four

Table 2.

Principal Component Loadings for the "How Do You Feel?" Scale

Item	Affective	Major Life Events	Daily Hassles	Displaced
16. Having scary dream	.76	*	*	*
18. Not getting 100%	.66	*	*	*
17. Sent to principal's office	.64	*	*	*
12. Losing game	.59	*	*	*
15. Going to hospital	.52	*	*	*
20. Hearing parent fight	.49	*	*	*
11. Laughed at in class	.48	*	*	*
10. Going blind	*	.77	*	*
14. Wetting pants	*	.70	*	*
07. Losing parent	*	.67	*	*
13. Kept back	*	.64	*	*
04. Caught stealing	*	.47	.49	*
09. New school	*	.41	*	.52
03. Poor report card	*	*	.73	*
06. No one believes you	*	*	.62	*
05. Going to dentist	*	*	.51	.45
01. Birth of a sibling	*	*	*	.67
08. Picked last	*	*	*	.55
Internal Consistency	.79	.76	.54	.48

* All component loadings less than .40 are eliminated from the table

components, were .79, .76, .54, and .48, respectively. The four components obtained in the analysis of the "How Do You Feel?" scale are similar in content to several of the components that were obtained in the analysis of the COPES. Again this suggests that the obtained stress components are representative of the types of events, or situations, that children report as being stressful.

To better consolidate the results from the two stress measures, a decision was made to perform a principal components analysis that combined the COPES and

"How Do You Feel?" scales. It was felt that such an analysis would serve a dual purpose, as it would: 1) condense the data into a more manageable number of stress components, and 2) strengthen some of the weaker stress components (i.e., the third and fourth components from the "How Do You Feel?" scale). Prior to conducting this analysis it was determined that the two scales were moderately correlated, r = .60. An initial principal components analysis using all the variables of the two stress measures resulted in a twenty component solution that accounted for 65% of the total variance. Examination of the individual item loadings revealed that 10 items had loadings of .30 or less. After reviewing these items it was decided that their content sufficiently overlapped with other items on the scales and a decision was made to eliminate them. The items eliminated along with their means and standard deviations are listed in Table 3. A principal components analysis, Varimax rotation, on the remaining 68 items yielded a five component solution that accounted for 40% of the total variance.

Table 3

Means and Standard Deviations of Ratings on Items Without Significant Component Loadings

Item	Mean*	SD
H01. Having a new baby sister or brother.	2.13	1.57
H06. Telling the truth, but no one believing me.	5.49	1.66
C06. Having a fight with your best friend.	3.57	1.15
C09. Moving.	3.18	1.32
C10. Being forced to do something you don't want to.	3.86	1.05
C11. Too many things to do.	2.85	1.20
C22. Something of yours gets stolen.	3.73	1.03
C45. Being lonely.	2.98	1.26
C47. Your pet runs away or dies.	3.96	1.20
C54. Getting lost in a strange place.	3.11	1.19

* The items from "How Do You Feel ?" (H) are based upon a 7 point Likert-type scale, whereas the items from COPES are based upon a 5 point Likert-type scale.

Interestingly enough, despite the moderate correlation between the two stress measures, there was a limited integration of the items on the emerging components. That is, the items from the COPES scale and the items from the "How Do You Feel?" scale remained relatively separate in their loadings. The five components that emerged from the analysis, however, were similar in overall content to those components obtained in the independent analyses of the two stress measures. The components that emerged from the combined analysis of the two stress measures were: Daily Hassles, Major Life Events, Affective-Anxiety, School, and Self-consciousness. These five components and their loadings can be found in Table 4. The internal consistency coefficients calculated for the components ranged from .77 to .92, with a median of .82. Similarities between these components and those obtained in the independent PCA's for the two stress measures, supports the use of these five components in an examination of the relationship between stress and academic achievement.

Standard multiple regression procedures using the five stress components (i.e., Daily Hassles, Major Life Events, Affective-Anxiety, School, and Self-consciousness) and three of the subtest scores (i.e., Reading, Language, Mathematics) and the overall total score (i.e, Basic Battery) from the Metropolitan Achievement Tests, were conducted to determine how the different categories of stress are related to academic achievement. Four separate regression analyses were run, using the five stress components as predictors for each of the criterion variables of achievement. The results showed that the combined stress components contributed 8 to 13% of the total variance for the standardized tests of achievement. Several significant relationships existed. First, for the achievement score Basic Battery, three stress components, Affective-Anxiety, School, and Self-consciousness were all

Table 4.

Principal Components Loadings for the Combined Children's Own Perceptions and Experiences and "How Do You Feel?" Measures of Stress

	Loadings for Stress Components				
Items**	S1	S2	S3	S4	S5
C56. Have to wait	.63	*	*	*	*
C55. Take advantage of you	.62	*	*	*	*
C49. Getting punished	.61	*	*	*	*
C38. Being ignored	.61	*	*	*	*
C50. Being compared	.59	*	*	*	*
C24. Can't concentrate	.58	*	*	*	*
C29. Not getting approval	.57	*	*	*	*
C44. Not believed	.56	*	*	*	*
C13. Too much homework	.55	*	*	*	*
C20. Can't do something	.54	*	*	*	*
C31. Being disappointed	.54	*	*	*	*
C34. Being interrupted	.52	*	*	*	*
C21. Getting blamed	.52	*	*	*	*
C58. Not able to perform	.50	*	*	*	*
C33. Parent worried	.47	*	*	*	*
C40. Being teased	.47	*	*	*	*
C07. Not enough money	.45	*	*	*	*
C15. People unfair	.43	*	*	*	*
C42 Being betrayed	.43	.43	*	*	*
C41. Needing help in school	.42	*	*	*	*
C27. Trouble with reading, writing, and math	.42	*	*	*	*
C37. Parents separating	*	.73	*	*	*
C39. Divorce of parents	*	.71	*	*	*
C26. Fights with parents	*	.61	*	*	*
C51. Hearing parents fight	*	.59	*	*	*
C25. Marriage of parent	*	.55	*	*	*
C17. Use of alcohol	*	.54	*	*	*
C23. Not knowing who to trust	*	.50	*	*	*
C30. Choosing parent	*	.48	*	*	*
C57. Drug use	*	.48	*	*	*
C53. Some one dies	*	.46	*	*	*
C28. Meet step-siblings	*	.45	*	*	*
C12. Parent loses job	*	.43	*	*	*
C03. Thoughts of death	*	.41	*	*	*
H16. Scary dream	*	*	.65	*	*
H19. Give report	*	*	.60	*	*
H12. Lose game	*	*	.57	*	*
H15. Go to hospital	*	*	.53	*	*
H18. Not get 100%	*	*	.53	*	*
H11. Laughed at in class	*	*	.51	*	*
H20. Hear parents fight	*	*	.48	*	*
H17. Sent to principal	*	*	.48	.42	*

Table 4. (continued)

Principal Components Loadings for the Combined Children's Own Perceptions and Experiences and "How Do You Feel?" Measures of Stress

	Loadings for Stress Components				
Items**	S1	S2	S3	S4	S5
H08. Picked last	*	*	.44	*	*
H05. Go to dentist	*	*	.41	*	*
C02. Suspended	*	*	*	.67	*
C43. Poor grades	*	*	*	.65	*
C04. Getting in big trouble	*	*	*	.64	*
C46. Caught stealing	*	*	*	.53	*
H03. Poor report card	*	*	*	.52	*
C05. Repeat a grade	*	*	*	.45	*
C14. Teacher yell at you	*	*	*	.43	*
H13. Kept back	*	*	*	*	.68
H10. Going blind	*	*	*	*	.66
H14. Wet pants	*	*	*	*	.66
H07. Lose parent	*	*	*	*	.58
H04. Caught stealing	*	*	*	*	.49
H09. New school	*	*	*	*	.46
Internal Consistency	.92	.87	.82	.80	.77

* All component loadings less than .40 are eliminated from the table
**Items are listed with "H" (How Do You Feel?) or "C" (Children's Own Perceptions and Experiences of Stress) in accordance to their respective measures.

S1=Daily Hassles, S2=Major Life Events, S3=Affective-Anxiety, S4= School, S5=Self-consciousness

significant predictors. These three stress components were also significant predictors for the achievement subtests of Mathematics and Reading. Self-consciousness was the only component that significantly contributed to the achievement subtest of Language. Two of the stress components, Daily Hassles and Major Life Events were not significant predictors for any of the criterion variables of achievement. Multiple correlations and beta weights for each of the achievement variables are shown in Table 5.

Table 5.

Beta Weights and Multiple Correlation Coefficients for Each Criterion Variable of Achievement

Criterion Variables	Multiple R	R^2	Beta Weights for Predictors S1	S2	S3	S4	S5
Reading	.283	.08	-.07	.08	-.21*	.21*	.18*
Language	.315	.10	-.08	.12	-.14	.15	.24*
Mathematics	.328	.11	-.13	.01	-.20*	.25*	.27*
Basic Battery	.356	.13	-.07	.09	-.24*	.24*	.26*

* Indicates significant predictors with $p < .05$.
S1=Daily Hassles, S2=Major Life Events, S3=Affective-Anxiety, S4=School, S5=Self-consciousness

Part Two

In this section, two analytic procedures were performed on the data. First, a principal components analysis was conducted on the self-rating temperament measure in order to extract the temperament components, or attributes. Second, regression procedures were employed to determine whether the temperament components play a significant role in children's perceptions of stress, the second hypothesis proposed by this study.

Prior to conducting the analysis, Cronbach's alpha was calculated to determine the internal consistency of the temperament measure, the Revised Dimensions of Temperament Survey (DOTS-R). The results showed a relatively moderate internal consistency rating of .74. A principal components analysis (PCA), Varimax rotation, yielded six interpretable components which accounted for 32% of the total variance. When compared to the results from a study that used the DOTS-R with sixth grade children (Windle & Lerner, 1986),

the six components emerging from this study not only manifested similar component loadings, but in fact identically matched several of the previously-obtained components. The temperament components emerging from this analysis are: Mood, Rhythmicity, Activity-General, Attention Span/Distractibility, Flexibility-Rigidity, and Activity- Sleep. The six components and their loadings can be found in Table 6. Internal consistency coefficients, calculated for each of the six components, ranged from .22 to .76, with a median of .69. Due to the low reliability ($r = .22$) of the fifth component, Flexibility-Rigidity, a decision was made to drop this component from the analysis. The range of the internal consistency coefficients for the remaining five components was .61 to .76, with a median of .69.

Standard multiple regression procedures, using the five temperament components (i.e., Mood, Rhythmicity, Activity-General, Attention Span/Distractibility, and Activity- Sleep) as the predictor variables and the five stress components (i.e., Daily Hassles, Major Life Events, Affective-Anxiety, School, and Self-consciousness) as the criterion variables, were conducted to determine what temperament variables, or components, were related to children's perceptions of stress. The results showed that the temperament components contributed 3 to 7% of the total variance for the different categories of stress. Several significant relationships existed.

The temperament attribute Mood significantly contributed to the stress components Major Life Events and School. Rhythmicity also had multiple categories (i.e., Daily Hassles and Affective-Anxiety) of stress that it significantly predicted. Activity-General and Attention-Span/Distractibility were also shown to be predicative of stress, with each temperament component significantly predicting one stress component (i.e., Daily Hassles and

Table 6.

Principal Components Loadings for the
Revised Dimensions of Temperament Survey (DOTS-R)

	Temperament Component Loadings					
Items	T1	T2	T3	T4	T5	T6
14. Do not laugh or smile	-.68	*	*	*	*	*
03. Laugh a lot	.68	*	*	*	*	*
28. Smile often	.68	*	*	*	*	*
51. Generally happy	.66	*	*	*	*	*
47. Mood is generally cheerful	.61	*	*	*	*	*
49. Laugh several times a day	.59	*	*	*	*	*
34. Do not laugh often	-.45	*	*	*	*	*
31. Eat same amount	*	.65	*	*	*	*
37. Same amount at breakfast	*	.61	*	*	*	*
42. Same amount at supper	*	.57	*	*	*	*
25. Same amount sleep	*	.52	*	*	*	*
27. Hungry same time	*	.51	*	*	*	*
36. Away from home, wake up same time	*	.48	*	*	*	*
46. Appetite stays the same	*	.47	*	*	*	*
40. Wake up same time	*	.42	*	*	*	*
02. Can't stay still	*	*	.72	*	*	*
23. Get fidgety	*	*	.71	*	*	*
29. Never stop moving	*	*	.61	*	*	*
11. Gets restless	*	*	.55	*	*	*
07. Move around a lot	*	*	.54	*	*	*
19. Stay still long time	*	*	-.41	*	*	*
52. Never in same place long	*	*	.40	*	*	*
06. Persist at task	*	*	*	.63	*	*
05. Nothing distracts	*	*	*	.61	*	*
15. Something occurring	*	*	*	.56	*	*
24. Hard to distract	*	*	*	.48	*	*
10. Stay with activity	*	*	*	.46	*	*
20. Aren't taken away	*	*	*	.45	*	*
43. Long time to get use	*	*	*	*	.45	*
13. Long time to adjust	*	*	*	*	.44	*
18. Change makes restless	*	*	*	*	.44	*
26. Move towards new people	*	*	*	*	.42	*
17. Reject something new	*	*	*	*	.42	*
32. Move in sleep	*	*	*	*	*	.72
38. Move a lot in bed	*	*	*	*	*	.71
45. Don't move much in sleep	*	*	*	*	*	-.64
41. Same place when fell asleep	*	*	*	*	*	-.57
Internal Consistency	.76	.69	.69	.61	.22	.69

* All component loadings less than .40 are eliminated from the table
T1=Mood, T2=Rhythmicity, T3=Activity-General, T4=Attention Span/Distractibility, T5=Flexibility-Rigidity, T6=Activity-Sleep

Self-consciousness, respectively). Activity-Sleep was not a significant predictor for any of the stress categories. Multiple correlations and beta weights for each of the temperament components are shown in Table 7.

Table 7.

Beta Weights and Multiple Correlation Coefficients Each of the Criterion Variables of Stress

Stress Components	Multiple R	R^2	Beta Weights for Predictors T1	T2	T3	T4	T6
Daily Hassles	.283	.08	.09	-.18*	.21*	.01	.01
Major Life Events	.228	.05	.15*	-.07	.10	-.04	-.11
Affective-Anxiety	.215	.05	.11	-.17*	.04	-.05	-.05
School	.206	.04	.15*	-.01	.10	-.08	-.02
Self-consciousness	.151	.03	.10	-.01	-.04	-.12*	-.03

* Indicates significant predictors with $p < .05$.
T1=Mood, T2=Rhythmicity, T3=Activity-General, T4=Attention Span/Distractibility, T6=Activity-Sleep

Part Three

To test the hypothesis, that the relationship between stress and academic achievement is mediated by temperament, a series of structural models were assessed for their goodness-of-fit. Prior to conducting the analysis, the results from Parts One and Two of this study were reviewed for the selection of the latent constructs. As previously outlined (see Method), the stress and temperament components identified as significant predictors in the first two parts of the data analysis were to be selected as the constructs for the structural model.

A review of Part One reveals that there were three stress components (i.e., Affective-Anxiety, School, and Self-consciousness) that significantly predicted

achievement. The data analysis from Part Two shows four temperament components (i.e., Mood, Rhythmicity, Activity-General, and Attention Span/Distractibility) were significant predictors for stress. A comparison of the two sets of results revealed that three of the predicative temperament components were paired with three of the predictive stress components. For example, the temperament component of Mood was a significant predictor for the stress component School. Likewise, the temperament component of Rhythmicity was a predictor for the stress component of Affective-Anxiety, and Attention Span/Distractibility was a predictor for Self-consciousness. Keeping with the decision format previously described (i.e., that the components be significant predictors), the three predictive stress components and three of the predictive temperament components (i.e., Mood, Rhythmicity, and Attention Span/Distractibility) were retained as constructs for the structural model. The temperament component Activity-General did not align with any significant stress component. Thus, a decision was made not to include it as a construct in the structural model.

Based on the number and types of constructs retained, four separate structural models were run. Each of the four models included the three constructs for stress and the construct for achievement. The variations between the models were in the temperament constructs. In an attempt to extrapolate the influence of the mediating variable a different temperament construct was used in each of the first three models (Figures 3A, 3B, and 3C). The fourth model, as shown in Figure 4, is the complete hypothesized structural model which includes all the selected constructs.

Once it was determined which components were to be used, attention was turned to setting up the model for analysis. To make the model more parsimonious, the measured variables (i.e., individual items) for each

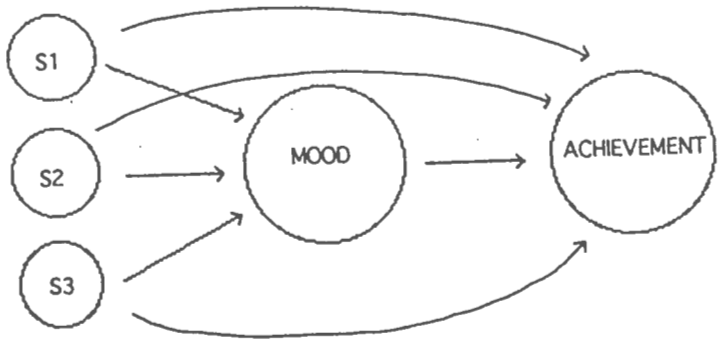


Figure 3A. Structural model 1 - The relationship between stress and achievement as mediated by mood

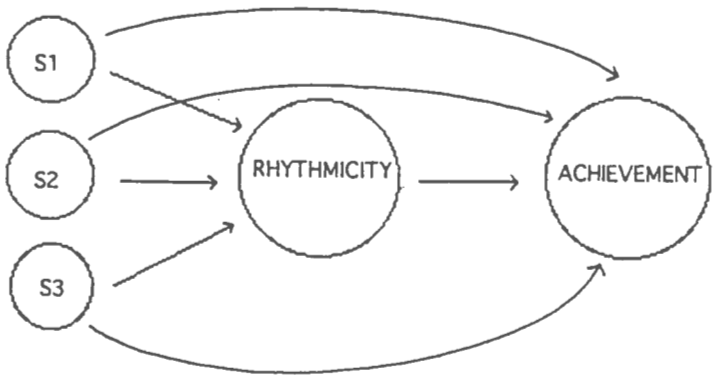


Figure 3B. Structural model 2 - The relationship between stress and achievement as mediated by rhythmicity

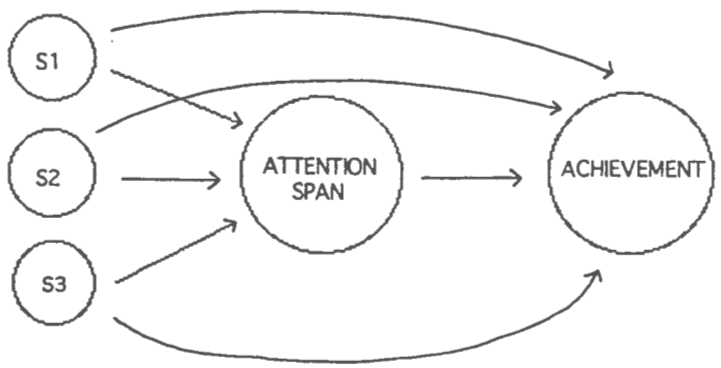


Figure 3C. Structural model 3 - The relationship between stress and achievement as mediated by attention span distractibility

S1=Affective-Anxiety, S2=School, S3=Self-consciousness

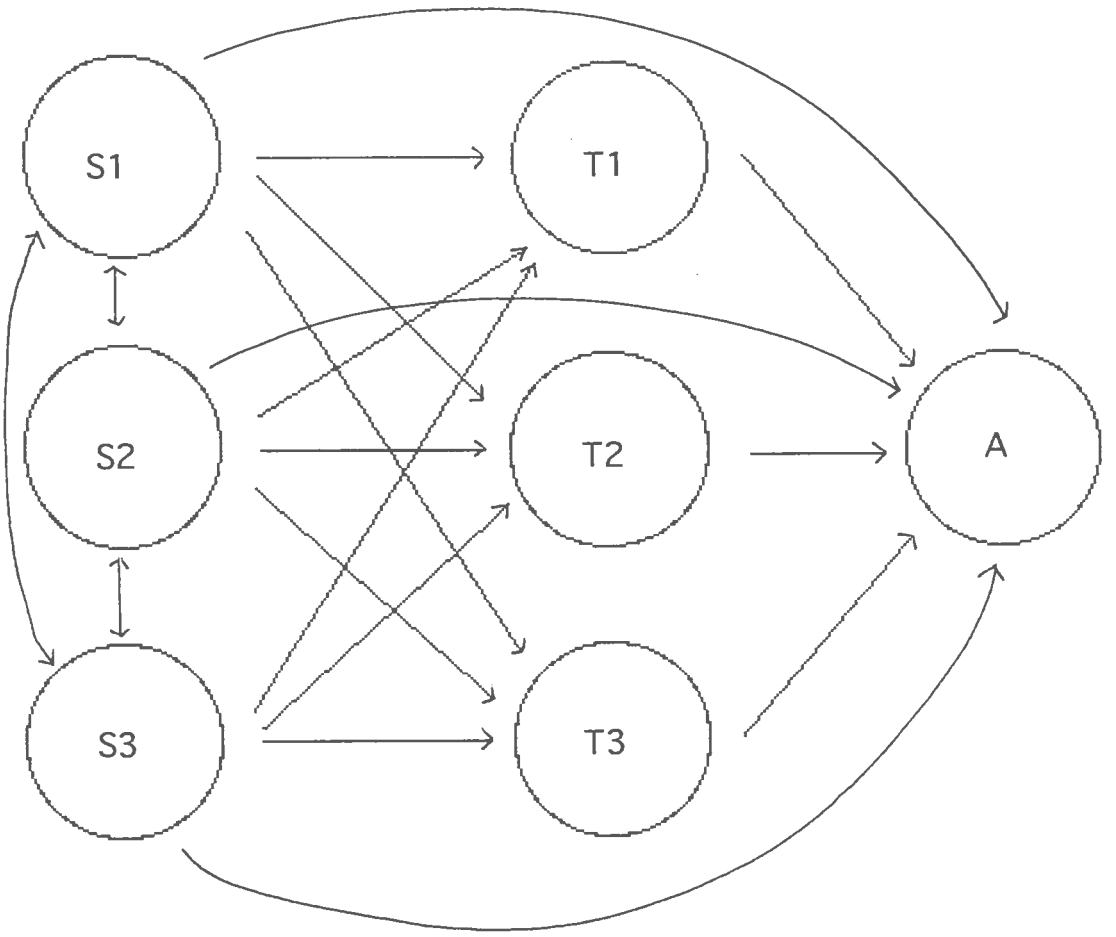


Figure 4. Structural model 4 - The relationship between stress and achievement as mediated by the three temperament constructs

S1=Affective-Anxiety, S2=School, S3=Self-consciousness

T1=Mood, T2=Rhythmicity, T3=Attention Span/Distractibility

A=Achievement

construct were combined into subgroupings. Regardless of the number of items loading on a component, the items were divided into three subgroupings. The mean value of each subgrouping was used as raw data for the analysis of the structural model. The measured variables, or items, were grouped in accordance with how they loaded on their respective components. That is, the items that had the strongest loadings were grouped together, then the items with moderate loadings were grouped together, and finally the items with the lowest loadings were grouped together. The path coefficients estimates for the model were based on the strength and nature (i.e., positive or negative) of the item loadings.

The Chi-square goodness-of-fit, one of the most widely-used measures for overall fit, tests how well the observed data match the hypothesized model. Statistically significant values for Chi-square result in the rejection of the null hypothesis. The smaller the Chi-square statistic the better the fit. As can be seen by the Chi-square values in Table 8, the difference between the observed and hypothesized model is statistically significant. However, since Chi-square is sensitive to sample size it is recommended that additional statistics for the goodness-of-fit be employed (Bentler & Bonett, 1980). The Comparative fit index has the advantage of not being influenced by sample size. Values for this index range from 0 to 1, with values better than .90 being desirable (Bentler, 1989). Based on this statistic all the tested models fell within the accepted range. In addition, the absolute standardized residuals for each of the models was low ranging from .044 to .049. Each of the parameter estimates (e.g., component loadings, correlations, regressions, errors of measurement, and prediction residuals) were examined for significance using z-ratios.

Table 8.

Summary of Fit Indices for the Four Structural Models

Model	Chi-square	df	p	CFI	Residuals
Model 1	179.48	80	.001	.93	.044
Model 2	183.13	80	.001	.97	.040
Model 3	191.91	80	.001	.92	.049
Model 4	284.28	152	.001	.91	.045

Model 1 (Mood as a Mediator). The path coefficients for Model 1, which used the temperament component Mood as the mediating variable, are shown in Figure 5. Six percent of the variance of Achievement was explained by the model. Despite the fact that the structural model fit the data, none of the path coefficients between the individual stress constructs and the temperament construct were significant. However, the path from Mood to Achievement was significant at the .01 level indicating that a relationship exists between these two variables. Additionally, the paths from the three individual stress constructs to the construct of Achievement were all significant at the .01 level indicating the presence of direct effects.

Model 2 (Rhythmicity as a Mediator). The path coefficients for the second structural model which used Rhythmicity as the mediator are presented in Figure 6. Thirty-four percent of the variance of Achievement was explained by the model. All of the path coefficients for the model were significant at the .05 level with most being significant at the .01 level. The strongest path coefficient for the mediating relationship occurred between Affective-Anxiety and Rhythmicity (r=-.63). The path coefficients between School and Rhythmicity, as well as Self-consciousness and Rhythmicity were also

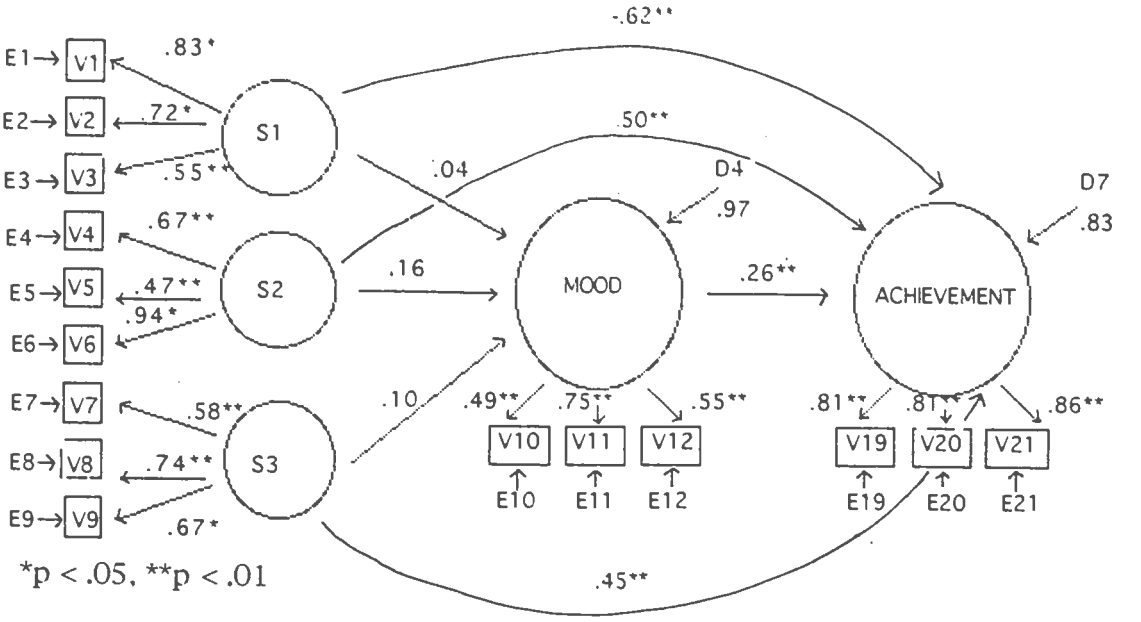
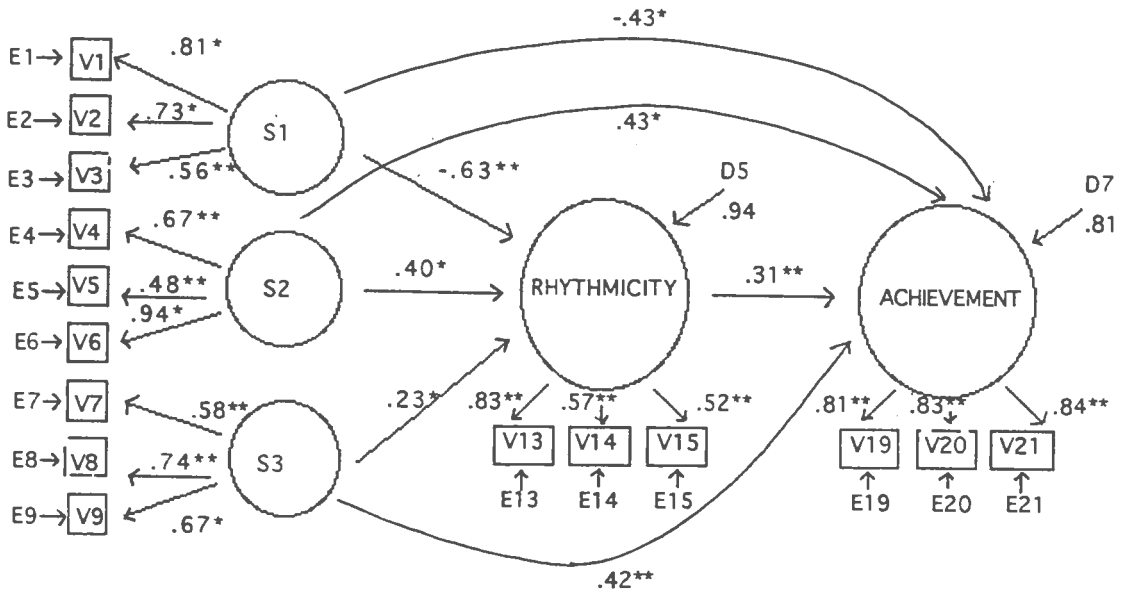


Figure 5. Structural model 1 - The relationship between stress and achievement as mediated by mood



*p < .05, **p < .01

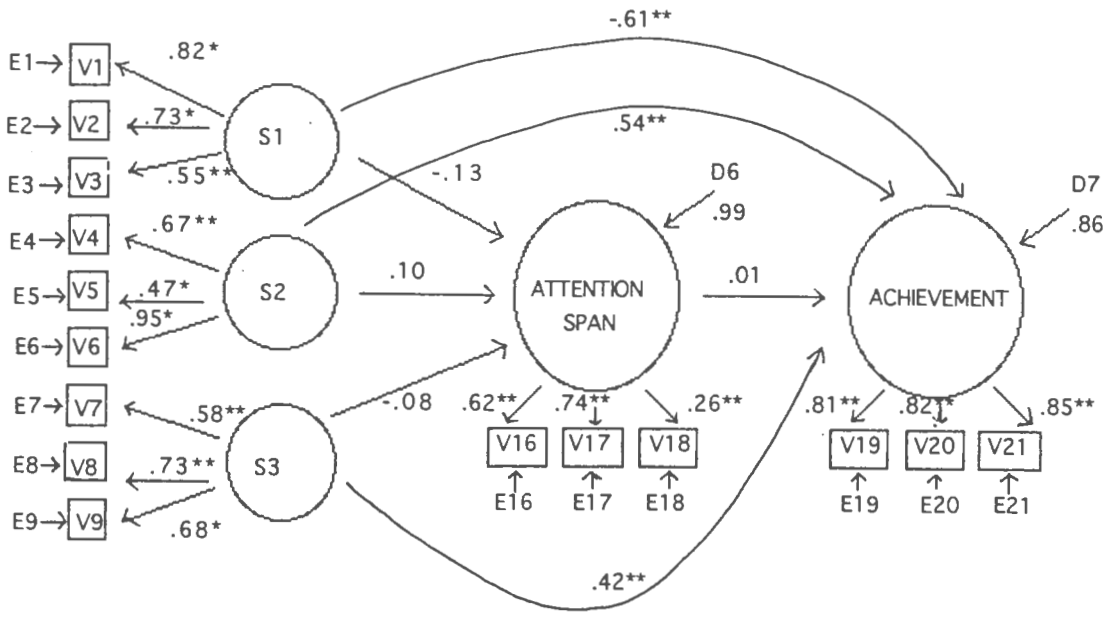
Figure 6. Structural model 2 - The relationship between stress and achievement as mediated by rhythmicity

S1=Affective-Anxiety, S2=School, S3=Self-consciousness

significant. However, the path coefficients for direct effects for these two constructs were relatively equal to the coefficients for indirect effects. Finally, the path coefficient between Rhythmicity and Achievement was significant at the .01 level.

Model 3 (Attention Span/Distractibility as a Mediator). Similar to Model 1, the results for the model that used Attention Span/Distractibility as a mediator, did not support the hypothesis. Only 2% of the variance for Achievement was explained by the model. Additionally, although the structural model fit the data, none of the path coefficients between the individual stress constructs and the temperament construct were significant. The path coefficients for this model are shown in Figure 7. An additional nonsignificant path coefficient occurred between the mediating construct and Achievement. Interestingly enough, all the paths from the individual stress constructs to Achievement were significant at the .01 level, indicating the presence of direct effects.

Model 4 (Complete Model). Fifty-six percent of the variance in Achievement was explained by this model. As previously noted, the fit indices for Model 4, which included all three temperament constructs as mediators for stress, were all in the acceptable range. However, as shown in Figure 8, not all the path coefficients were significant for this model. None of the path coefficients between the three stress constructs and the temperament constructs of Mood and Attention Span/Distractibility were significant. In fact, only the temperament construct of Rhythmicity showed significant path coefficients ($p < .05$) for the three stress constructs. Additionally, nonsignificant path coefficients occurred between: Affective-Anxiety and Achievement; School and Achievement. Finally, the path between the mediating construct of Attention Span/Distractibility and Achievement was also nonsignificant.

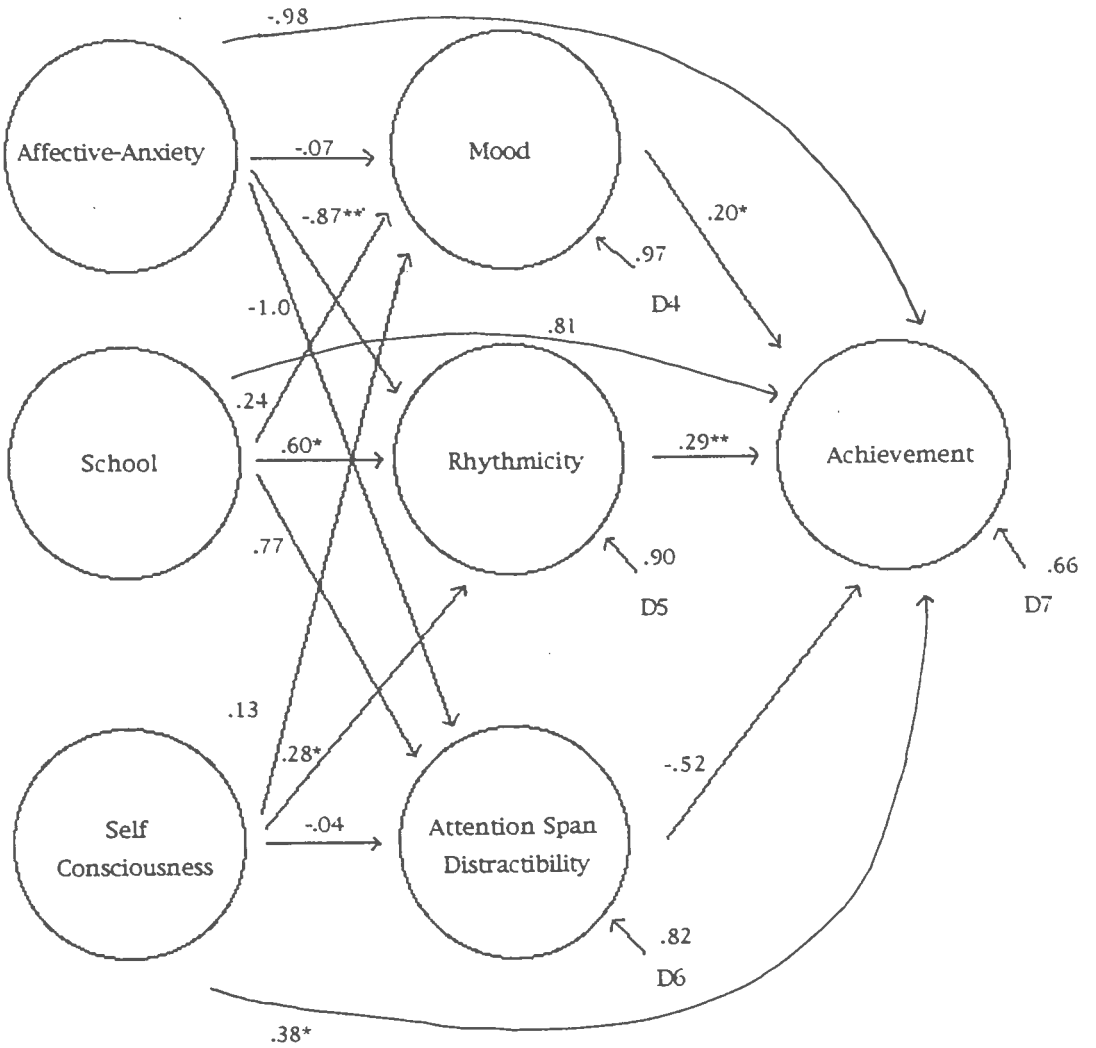


*p < .05, **p < .01

Figure 7. Structural model 3 - The relationship between stress and achievement as mediated by attention span/distractibility

S1=Affective-Anxiety; S2=School; S3=Self-consciousness

A review of Model 4 reveals that the temperament construct of Rhythmicity emerged as the only significant mediator between stress and achievement. These findings are similar to the results obtained in the analysis of Model 2, which used only Rhythmicity as a mediator for the stress constructs. In fact, the relationship between Rhythmicity and the stress constructs remained relatively the same in both models, which indicates that the additional temperament constructs did not add to the model. This suggests that the more parsimonious model, using Rhythmicity as the only mediator, is the best fit for the data.



*p <.05, **p < .01

Figure 8. Path coefficients for structural model 4 - The relationship between stress and achievement.as mediated by the three temperament constructs

S1=Affective-Anxiety, S2=School, S3=Self-consciousness

T1=Mood, T2=Rhythmicity, T3=Attention Span/Distractibility

CHAPTER V

Discussion

The primary objective of this study was to examine the relationship among stress, temperament, and academic achievement in middle-school children. Three hypotheses were proposed for the study, each focusing on the potential relationships that may exist between the predictor and criterion variables. A sequence of data-analytic procedures were employed to address these hypotheses.

The Relationship Between Stress and Achievement

The first hypothesis focused on the different life events perceived as stressful by children and their relationship with academic achievement. Analytic procedures (PCA) were employed to extract, or identify, categories representative of children's perceived stress from the two self-report measures of stress. The two stress measures were analyzed separately before being combined for analysis. The analysis of the combined measures yielded five components: Daily Hassles, Major Life Events, Affective-Anxiety, School, and Self-consciousness. Similarities were noted in the stress components obtained in this study and those stressors identified previously by researchers (Colton, 1985; Dise-Lewis, 1988; Elwood, 1987; Honig, 1986; Omizo, Omizo, & Suzuki, 1988; Wertlieb, Weigel, & Feldstein, 1987), lending support to the argument that these five components are representative of children's perceived stressors.

In the analyses of the two stress measures, COPES and "How Do You Feel?," there was minimal integration of the items despite a moderate correlation between the scales. That is, the items from the COPES scale and the items from the "How Do You Feel?" scale remained relatively separate in their component

loadings. For example, in the combined analysis, items that clustered on the Major Life Events component of the "How Do You Feel?" scale did not combine with the items that clustered on the Major Life Events component of the COPES scale. Instead two separate components emerged. The one exception was the School component, which was made up of six items from the COPES scale and two items from the "How Do You Feel?" scale. It is felt that the items on this component are very situation-specific (i.e., directly related to the school environment), thus explaining their integration into a single stress component. The successful integration of items from both scales into the School component raises the question of why such an integration of items was not accomplished on the remaining components. To address this question, it is necessary to return to a previous discussion on the controversies that exist regarding the concept of stress.

The results of the current analyses support previous research findings, that stressful life events can be categorized according to the nature of the events (i.e., major versus minor) (Coddington, 1971; Kanner, Cayne, Schaefer, & Lazarus, 1981; Sandler & Ramsay, 1980). In particular, Major Life Events and Daily Hassles were the two components emerging in this present analysis that grouped environmental events according to the nature of events. These classifications (i.e., major and minor life events), however, speak more of the magnitude of readjustment required due to the occurrence of the environmental event. The focus is solely on the amount of change needed as a result of the life event "and not on psychological meaning, emotion" (Holmes & Rahe, 1967, p. 217). As noted previously in the literature review, researchers do differ in their views of whether stress is represented by the environmental event or the interaction of the environmental event with characteristics of the individual (e.g., emotion). An interactional approach

allows the definition of stress to extend beyond just the environmental event (Lazarus & Launier, 1978). In fact, two of the stress components, Affective-Anxiety and Self-consciousness, are represented more effectively by an interactional approach. Using the interactional approach allows stressful life events to be classified by their potential for emotional impact (i.e., type of emotional response elicited). This classification views stressful events in terms of their potential to create similar reactions (i.e., emotional) in children. Therefore, the current research findings suggests the existence of two distinct classifications or types of stress for children: event-based stress and affect-based stress.

It was only when the two stress measures were combined for analysis, that the two distinct classifications of stress (i.e., event-based stress and affect-based stress) were highlighted. Using these two classifications, three of the emerging stress components: Major Life Events, Daily Hassles, and School were the categories of perceived stress defined by the severity or type of environmental demands (i.e., event-based stress) they place on children. The remaining stress components, Affective-Anxiety and Self-consciousness, were the categories of perceived stress defined by their potential for creating emotional impact (i.e., affect-based stress). It is felt that the confusing nature of stress (i.e., the lack of agreed-upon definition) contributed to the failure to differentiate between these two distinct categories of stress in the individual analyses of the measures. It was not until the emerging components from the combined analysis were compared that the differences could be identified.

The labeling of the stress components with emotionally-ladened terminology suggests that these components encompass more than just the characteristics, or demands, presented by the environmental event. In fact, the defining characteristic of the affect-based stressors, the potential for

creating emotional impact, suggests that the characteristics of the individual (i.e., child) are also included. However, it is important to note that the characteristics of the individual child have not been subsumed in the items on the Affective-Anxiety and Self-consciousness components. A review of the individual items found on these two components reveals that only the events themselves are represented, and that emotional reactions are not a part of the item, or life event. For example, "Getting up in front of the class to give a report," includes only the environmental event and not any reactions of the child. It does appear, however, that the potential reactions of the child (e.g., anxiety) to the environmental event is the binding thread for the life events on these components. Regardless of the implications created by their names, the Affective-Anxiety and Self-consciousness components do meet the criterion set at the start of the study, that stress be defined by the environmental events that are perceived as demanding.

Following the extraction of the stress components, the hypothesis, that the different life events perceived as stressful by children are related to academic achievement, was examined. Four separate regression analyses were conducted, using the five stress components as predictors for each of the four criterion variables of achievement (i.e., Basic Battery, Reading, Mathematics, Language). The results showed that three stress components were significant predictors for achievement.

Self-consciousness was the only category of stress that contributed significantly to all four variables of achievement. The regression analysis revealed that Affective-Anxiety was also a significant predictor for achievement (i.e., Reading, Language, and Mathematics). The fact that it is the two categories of perceived stress classified as affect-based stressors that are shown to be related to achievement warrants further discussion.

The negative direction of the relationship between the two affect-based stress components and achievement suggests that an increase in the perception of life events that have the potential to create an emotional response in children is adversely related to achievement. Similar negative relationships between stress and achievement have been documented in the literature (Chandler, 1985; D'Aurora & Fimian, 1988; Humphrey, 1988; Sandler & Block, 1979). However, in these previous studies the stressful life events had actually occurred in the lives of the children assessed. In the present study, it was children's perceptions of the stressful life event that were measured. The similar findings (i.e., that a negative relationship exists between stress and achievement) across the two types of studies (i.e. those measuring children's stress by actual experience of the life event versus those measuring children's stress by perceptions of the life event) suggests that even if children have not experienced a particular life event, they are not immune to its stressful effects. Thus, direct involvement may not be a necessary component for the negative effects of stress on academic achievement. Instead, it is concluded that children's perceptions of the stressfulness of particular life events (i.e., those defined by potential emotional impact) also negatively related to school performance.

The component School was also a significant predictor for the achievement areas of Reading, Language, and Mathematics. This was the only event-based stress component that was predictive of achievement. One explanation for the fact that School was the only component in this stress category that significantly predicted achievement is that the component is comprised of environmental events directly related to an educational setting (i.e., "Being suspended from school" and "Getting poor grades in school"). In comparison, Daily Hassles and Major Life Events, the other two event-based stress

categories, did not significantly predict achievement. Thus, it is suggested that Daily Hassles and Major Life Events, as general categories of stress, do not have a role in academic achievement.

To summarize, the results of the regression analyses support the first hypothesis, that the different life events perceived as stressful by children are related to academic achievement. Additionally, differences were found in the relationship between achievement and the types of stress, with the affect-based stressors being more frequent predictors of achievement than the event-based stressors. These differences suggest that when examining the relationship between stress and achievement, that an identification of the different types of stress (i.e., event-based or affect-based) may allow for a greater understanding of the relationship between these variables. Furthermore, since it was the affect-based stress components that were the major predictors for achievement, it is concluded that definitions for stress based solely on the life event do not accurately capture the complexities of this construct. For even when the concept of stress is limited to the life event itself, as was the case in the present study, the characteristics of the child (i.e., emotional reactions) still emerge as a defining characteristic for stress. This supports the argument that the relationship between the stressful life event and the child is not necessarily an independent one. Instead, the relationship may be more interactional in nature, which provides endorsement for an exploration into the relationship between stress and temperament.

The Relationship Between Temperament and Stress

The second hypothesis focused on the role of temperament in children's perceptions of stress. Analytic procedures (PCA) were employed to extract components representative of temperament from the self-rating temperament

measure (DOTS-R). Following the identification of the temperament components, multiple regression procedures were used to determine whether temperament was a significant predictor of children's perceived stressors.

The PCA yielded six temperament components: Mood, Rhythmicity, Activity-General, Attention Span/Distractibility, Flexibility-Rigidity, and Activity-Sleep. However due to its low internal consistency, the Flexibility-Rigidity component was omitted from further analysis. Previous researchers have also found this component and an analogous component (i.e., Adaptability) to be relatively unstable (Hubert, Wachs, Peters-Martin, & Gandour, 1982; Lerner, Palermo, Spiro, & Nesselrode, 1982; Palisin, 1986). The remaining five components are similar in content to those obtained by previous researchers (Lerner, Palermo, Spiro, & Nesselrode, 1982; Paget, Nagle, & Martin, 1984; Thomas, Chess, & Birch, 1968; Windle, 1992; Windle & Lerner, 1986), lending support to the argument that these components do represent rather stable attributes of temperament. Additional support is gathered from the fact that the five temperament components from this study closely matched several of the temperament attributes identified by the scale developers (Windle & Lerner, 1986).

The original analysis for the DOTS-R (Windle & Lerner, 1986) showed a seven component solution, compared to the six component solution obtained in the present study. Goldsmith and Rieser-Danner's (1990) review of the temperament measures based on the New York Longitudinal Study shows that item-based factor analyses generally suggest fewer than the original nine temperament dimensions. Furthermore, it is presented that some of the discrepancies (i.e., number and type of factors emerging) are a reflection of the use of such measures across a wide age range (i.e., infancy through young adulthood). The temperament attribute that failed to emerge in the current

analysis was Approach-Withdrawal. The items for the Approach-Withdrawal attribute did not load on any of the components in this study. Previous research studies based on the DOTS-R and its predecessor the DOTS (Dimensions of Temperament Survey) have found the Approach-Withdrawal attribute to be inconsistent. In a research project that used the DOTS for three age groups, early childhood to young adulthood (N=1386), the reliability coefficients for the Approach-Withdrawal for three age groups were .79, .44. and .78 (Lerner, Palermo, Spiro, & Nesselrode, 1982). In another study using the DOTS with middle school children (N=194), the range of alpha coefficients for the Approach-Withdrawal component was .35 to .69 (Lerner, Lerner, & Zabski, 1985). The above research citations provide some explanation for why the Approach-Withdrawal component failed to emerge in the present study.

Following the extraction of the temperament components, the hypothesis that the temperament attributes differ in their relationship with children's perceived stress was examined. Four separate regression analyses were conducted, using the five temperament attributes, or components, as predictors for each of the five criterion variables of perceived stress. The results showed that four of the temperament attributes were significant predictors of perceived stress. Additionally, different combinations of temperament predictors and stress components emerged from the analyses. For example, Mood was the only significant predictor for the stress component School. A summary of the predictive temperament attributes and their associated stress components is shown in Table 9.

The nature of the relationships (i.e., direction) between the temperament predictors and their respective outcome variables (i.e., categories of stress) provides additional information about the role of temperament in children's

Table 9

Summary of Significant Temperament Predictors for the Five Components of Stress

Stress Components	Temperament Predictors				
	Mood	Rhythmicity	Activity General	Attention Span	Activity Sleep
Daily Hassles		XX	XX		
Major Life Events	XX				
Affective-Anxiety		XX			
School	XX				
Self-consciousness				XX	

perceptions of stress. For example, there were several negative correlations present in the predictive relationships. In the analyses, Rhythmicity emerged as a negatively correlated predictor for the stress category of Daily Hassles. Since Rhythmicity is generally defined as the routine pattern of biological functions (i.e., eating, sleeping) (Goldsmith et al., 1987), the obtained results indicate that irregular, or unpredictable, styles in daily habits are associated with greater amounts of perceived stress from Daily Hassles. A negative relationship also exists between Rhythmicity and the stress category Affective-Anxiety, which again indicates that irregular patterns of daily habits are associated with greater amounts of perceived stress, this time from those environmental events that have the potential to elicit an emotional or anxious response. These relationships (i.e., Daily Hassles and Rhythmicity; Affective-Anxiety and Rhythmicity) suggest that the ability to maintain a routine pattern is important in children's perceptions of stress.

A negative correlation was also found for the temperament attribute Attention Span/Distractibility and the stress category Self-consciousness. Attention Span/Distractibility is associated with a child's ability or inability to attend to a task or situation. A negative relationship between Attention Span/Distractibility and Self-consciousness indicates that an increase in the occurrence of events from this category of stress is associated with an increase in distractible behaviors. This association appears logical, as children preoccupied with issues pertaining to themselves would have less capacity to attend to other areas of their lives.

The regression analysis also revealed several positive correlations between the temperament attributes and categories of stress. The temperament predictor Mood was positively correlated with both School and Major Life Events. Since higher scores on Mood are characterized by higher levels of positive affect (e.g., smiling, agreeable, pleasant), it is interesting that the relationship between this temperament attribute and the categories of perceived stress is a positive one. The positive correlation indicates that a more agreeable mood is associated with greater amounts of perceived stress, which is opposite of what would normally be expected. One possible explanation for these findings is that all the mood quality items on the DOTS-R are positive in affective content (Windle, 1992). For instance, key words for items on this temperament component are cheerful, happy, and smiling. There are no negatively-oriented affective characteristics (i.e., unhappy, depressed, angry) included in the scale items. This skewed presentation of items may have diminished the potential emergence of more negative mood qualities in the relationship between temperament and stress. In the future a more balanced item representation (i.e., a more equal number of positive and

negative mood items) may allow for a more realistic assessment of the relationship between Mood and Achievement.

The results also revealed a positive correlation for the predictor Activity-General and the stress category of Daily Hassles. Daily Hassles stressors are those frustrating and demanding situations that are a part of everyday life. Examples of items categorized as daily hassles include: having to wait, an inability to concentrate, not being able to do something, and being interrupted. Higher scores on Activity-General are typically associated with high levels of energy and overt motor activity. Subsequently, a positive correlation between these two variables indicates that higher levels of motor activity are predictive of greater amounts of Daily Hassles type stress. It should also be pointed out that the temperament attribute Rhythmicity was also a significant predictor for the stress category of Daily Hassles. The correlation coefficient for Rhythmicity and Daily Hassles was negative, indicating the presence of irregular patterns in daily routines being connected to this stressor. The composite created by these three variables (i.e., the two temperament predictors and one stress category) is that unpredictable styles and higher levels of motor activity are associated with a greater amount of frustration from demanding life-event situations. In other words, it is the more stable (e.g., regular and less active) child that will perceive Daily Hassles as stressful. Thus, it can be concluded that in middle-school children the ability to regulate one's own behavior plays an important role in the amounts of daily hassles type stress in the lives of children.

The analyses from this part of the study support the hypothesis that different temperament attributes are related to children's perceptions of stress. Specifically, the results showed that there were different combinations of temperament predictors for the categories of perceived stress. There was no

one temperament attribute that played a significant role in all of the different categories of stress. Instead, the temperament attributes related differently to the various types of stressors. As was found in the examination of stress and achievement in Part One, the findings from Part Two again show that the characteristics of the individual child cannot easily be extracted from the environmental event. Therefore, it could be concluded that the relationship between temperament and stress is more interactional in nature. Additionally, it appears that some of the temperamental attributes (i.e., those shown to be predictive of stress) may have a greater role in children's perceptions of stress. That is, a child's temperamental style may play a role in how a child views particular types of life events, and whether or not they are considered stressful. The question left to explore is whether specific temperament attributes act as mediators in the relationship between stress and achievement, which leads to the discussion of the four theorized structural models assessed.

The Relationship Between Stress and Achievement as Mediated by Temperament

The final hypothesis of this study focused on the relationship between stress and academic achievement as mediated by temperament. The variables for the theoretical structural model were the significant components (i.e., stress and temperament predictors) identified in the first two sets of analyses for this study. The three stress constructs for the structural model were: Affective-Anxiety, School, and Self-consciousness, which were found to significantly predicted achievement. The three temperament constructs were: Mood, Rhythmicity, and Attention Span/Distractibility, which were found to be related to children's perceptions of stress. Four structural models were assessed for their goodness-of-fit. The variations in the models occurred with

the temperament constructs. A different temperament construct was used in each of the first three models, while the fourth model included all three of the temperament constructs.

Based on standard indices of fit, the four structural models fit the data reasonably well. However, these results are deceptive, for many of the path coefficients in the different models were not significant. In fact, none of the path coefficients for the mediating variables of Mood or Attention Span/Distractibility were significant in the models. Also, in the Complete Model (i.e., which used all three temperament constructs), several nonsignificant paths existed. The only temperament construct that successfully mediated stress in any of the models tested was Rhythmicity. Even though most of the tested models did not support the hypothesis, the results warrant discussion.

Model 1 (Mood as a Mediator). The hypothesis that Mood mediates the relationship between stress and achievement was not supported by the analysis. Although the structural model met the statistical criteria, none of the path coefficients between the individual stress constructs and the temperament construct were significant. An examination of the paths showed that all the coefficients from the stress constructs to the mediating variable were extremely low. Additionally, only 6% of the explained variance in the model was captured by the temperament construct Mood, suggesting that the construct did not have sufficient strength to act as a mediator. Therefore, the hypothesis that Mood acts as a mediating variable between stress and achievement was not supported. However, the path coefficient from Mood to Achievement was significant indicating that a relationship does exist between these two variables. Furthermore, the positive direction of the correlation

suggests that a more positive mood (i.e., agreeable, pleasant) is associated with higher levels of academic achievement.

In the model significant path coefficients were found for direct effects (i.e., from the three stress constructs to Achievement). The direct path from Affective-Anxiety to Achievement had the highest correlation which was negative. Thus, it is possible to conclude that as there is a decrease in children's perceptions of affect-based stressors (i.e., those that create an emotional impact), there is an increase in academic achievement. Similar findings, that a negative relationship exists between stressful life events and achievement, have been noted in the research (Humphrey, 1988). There were moderate correlations on the direct paths of School and Achievement, as well as Self-consciousness and Achievement, supporting earlier findings (Part One) that these two categories of stress are also related to academic performance.

Model 2 (Rhythmicity as a Mediator). The hypothesis that Rhythmicity mediates the relationship between stress and achievement was supported by the analysis. The fit indices and path coefficients for the model were all well within the acceptable range. Additionally, 34% of the variance in Achievement was explained by the model, which is evidence that a relationship does exist among the variables of stress, temperament, and achievement. The results also showed that the stress category of Affective-Anxiety was successfully mediated by the temperament construct of Rhythmicity. Additionally, the stress category Self-consciousness was significant for direct effects. Finally, the direct and indirect effects for the stress category of School were relatively equal in strength.

A closer examination of the model showed that Rhythmicity captured 12% of the explained variance in the model. A moderate path coefficient between

Rhythmicity and Achievement supported a relationship existing between these two constructs. For Affective-Anxiety, the path coefficient for indirect effects was higher than the path coefficient for direct effects. The direction of the correlation between Affective-Anxiety and Rhythmicity was negative, indicating that higher levels of this type of stress (i.e., events that have the potential to elicit emotional or anxious responses) are associated with irregular patterns of daily habits. Similar findings were previously noted in this study. The present finding provides additional support for the earlier interpretation that maintaining a routine pattern of daily habits plays an important role in children's perceptions of stress. Previously, researchers have found that an irregularity of habits is a behavioral style usually associated with more difficult temperaments (Thomas & Chess, 1986) and higher incidents of behavior disorders in children (Graham, Rutter, & George, 1973). Somewhat similar, the current findings indicate that the child with irregular habits or a more difficult temperamental style may have less of a capacity to effectively deal with affect-based type stressors, and in turn the stressors are more likely to affect their academic achievement..

For the stress construct Self-consciousness, the path coefficient for direct effects was moderate in strength, as compared to a relatively low path coefficient for indirect effects. A review of the items associated with the Self-consciousness construct offers one explanation for the direct effects. In particular, it is noted that many of the items from this category of stress are life events that have the potential to alter a child's self-perceptions (i.e., being kept back, going blind, losing a parent). It is suggested that the temperament construct of Rhythmicity does not have the capacity to mediate the influence of these types of perceived stressors. Instead the emotional and stressful

reactions associated with such events would directly effect a child's academic achievement.

The direct and indirect paths for the stress category of School were relatively equal in strength. These results indicate that the mediating relationship (i.e., School through Rhythmicity to Achievement) contributes approximately the same amount of variance as the direct relationship (i.e., School to Achievement). Therefore, an accurate picture of school-related stressors and their relationship to school performance, would include both the direct and indirect paths. The positive path coefficients for direct effects indicates that increased school stress is associated with increased regularity of daily habits. Although this appears strange, the influence of school-related stress could be paradoxical. That is, it may provide just enough of a discomfort level to be motivating.

To conclude, a review of the significant relationships in this model offer support for the mediating role of Rhythmicity between children's perceptions of stress and achievement. One explanation for the findings focuses on the developmental processes occurring for children in early adolescence, the age range of the subjects in this study. It is during early adolescence that children are developing increased self-reliance and decreased dependence (Erikson, 1980) on adult caretakers (i.e., parents, teachers, club leaders) to regulate their activities. Thus, it could be expected that children with less ability to maintain regular patterns of activities may find environmental circumstances to be more stressful. The temperament literature does not identify Rhythmicity as an attribute typically associated with achievement. However, it should be noted that much of the temperament research has been conducted with younger age groups. Possibly Rhythmicity does not emerge as a significant contributor until the later developmental stages where there is

increased independence and self-reliance. Thus, it could be concluded that the importance of Rhythmicity in children's stress is associated with children's increased reliance on their own internal systems.

Model 3 (Attention Span/Distractibility as a Mediator). The hypothesis that Attention Span/Distractibility mediates the relationship between stress and achievement was not supported by the analysis. Similar to the first model, this structural model met the statistical criteria for goodness-of-fit. However, the path coefficients between the individual stress components and the temperament component were not significant. An examination of the paths showed that all the coefficients from the stress constructs to the mediating variable were extremely low. Additionally, only 2% of the explained variance in the model was captured by the temperament construct Attention Span/Distractibility, suggesting that the construct did not have sufficient strength to act as a mediator. Also, the path from Attention Span/ Distractibility to Achievement was nonsignificant indicating the lack of a relationship between these two constructs. Therefore, the hypothesis that Attention Span/Distractibility acts as a mediating variable between stress and achievement is not supported. It should be noted that the reliability estimate for Attention Span/Distractibility was lower than any other temperament component, which could account for its poor performance in the structural model.

The results obtained for this model contrast findings of previous researchers (Keogh, 1989; Martin, 1989; Martin, Nagle, & Paget, 1983) who have documented that Attention Span/Distractibility is one of the temperament attributes related to achievement. These previous studies, however, used teacher ratings of temperament in children, which have been shown to be influenced by teachers' views on important school-related characteristics for

children (Keogh, 1989). Since the present study had the children rating their own temperamental styles, this may account for the differences found in the relationship between Attention Span/Distractibility and Achievement. Children's ratings of their own behavior may differ greatly from adult rating of children's behaviors; certainly this has been the case with other comparisons of child and adult ratings (Yamamoto & Felsenthal, 1982). Additionally, in considering the contrast of findings, it should be noted that most of the studies showing a relationship between Attention Span/Distractibility and Achievement used younger children (e.g., elementary school children) as subjects. Since the ability to attend is an important factor in early schooling, the age of the participants is an important variable to consider in studies examining the variables of temperament and achievement. Therefore, the age differences between the current study and previous studies could also account for the differences in results obtained.

Model 4 (Complete Model). The hypothesized structural model using all three temperament constructs as mediators met the statistical criteria for goodness-of-fit. However, as with two of the previous models, several of the path coefficients in the Complete Model failed to reach significance. Additionally, there were several findings for this model that were difficult to interpret. Specifically, it was the substantial increase in the amount of variance contributed by one mediating construct and the nonsignificant direct paths coefficients for two of the stress constructs that were suspicious. The only temperament construct that successfully mediated stress in the Complete Model was Rhythmicity.

The amount of explained variance for the Complete Model was 56%. The variance contributed by each of the mediating temperament constructs was: 6% for Mood; 19% for Rhythmicity; and 33% for Attention Span/Distractibility.

The amount of variance explained by Mood in the two models using it as a mediator (first and fourth) was equal. There is an increase (from 12% to 19%) in the amount of variance explained by Rhythmicity in this model as compared to the second model. The last temperament mediator, Attention Span/ Distractibility, showed a remarkable increase in the amount of variance explained (from 2% to 33%) in the two models that included it as a mediator (third and fourth). The two models that used Attention Span/Distractibility as a mediator also showed an increase in the path coefficients from this temperament construct to Achievement (from .01 to -.52). Although at first glance this may suggest that the more complex model provided a better explanation for Attention Span/Distractibility, a closer examination supports another interpretation.

The results of the Complete Model suggest that there is some overlap among several of the constructs. This may be a contributing factor for the increased variance explained by the Attention Span/Distractibility construct. Additional support for the argument that Attention Span/Distractibility overlaps with other constructs in the model is shown in the path coefficients from this temperament construct to the stress constructs of Affective-Anxiety and School. These two variables show very high path coefficients that are not significant. This discrepancy suggests that the latent construct Attention Span/Distractibility may be redundant or at least sharing variance with these constructs in the model. Since the correlation matrix from the analysis showed that Attention Span/Distractibility was moderately correlated with Affective-Anxiety (r=-.39), support is gained for the overlap. Finally, since the two models that included Attention Span/Distractibility as a mediator (i.e., third and fourth) differed only in the number of temperament constructs

included, the temperament constructs may be another source of potential overlap.

Some of the nonsignificant path coefficients from the Complete Model resembled some of the findings from the first three models. That is, it was the indirect paths for the mediating constructs of Mood and Attention Span/Distractibility that were not well-defined by the model. Additionally, the path from Attention Span/Distractibility to Achievement was not significant. Different from the previous models, there were also some direct paths that were not significant. Specifically, it was the paths from Affective-Anxiety to Achievement and School to Achievement that did not hold up in this model. This occurred despite the fact that the path coefficients for direct effects were higher than the path coefficients for indirect effects. The correlation matrix generated in the analysis revealed a strong relationship between these two stress constructs (r=.84) which again indicates a high degree of overlap.

The only temperament dimension that significantly contributed to the model was Rhythmicity. In fact, the results for Rhythmicity in the Complete Model were similar to those obtained in the previous model that used Rhythmicity as a mediator (i.e., second model). The nonsignificant direct path coefficient for the stress constructs of Affective-Anxiety and School, however, make it difficult to interpret the full impact of Rhythmicity in this final model. For instance, the strength of each of the direct paths exceeds that of the indirect paths (i.e., through Rhythmicity), however, the direct paths are not significant making a comparison difficult. Thus, a smaller model (i..e, using less temperament constructs) may be the more desirable model for examining the mediating role of temperament for the relationship between stress and achievement. The smaller model would also decrease the amount of overlap present in the larger Complete Model. Thus, the results of the analysis

Implications for Future Research

This study was the first known research project that examined the relationships among stress, temperament, and academic achievement in children. The fact that several significant relationship were found among the variables supports the need for additional research in this area. The obtained results suggest several areas that warrant further examination.

First, additional research needs to be conducted on the two distinct types of children's perceived stress (i.e., event-based stress and affect-based stress) found in this study. Not only should there be studies exploring the existance of these two types of stress for children, but also their relationship to the various aspects of academic achievement. In regards to temperament, since the affect-based stressors were successfully mediated by temperament, this suggests that an interactional relationship exists between these two variables. Future studies focusing on this interactional relationship may not only provide more information on the role of temperament in stress, but also assist in the identification of other factors (i.e., individual characteristics) that play a role in children's perceptions of stress. Furthermore, research on the interactional nature between stress and the characterisitics of children may prove to be useful in reaching a consensus on the defining properties of stress and the role of temperament in stress.

Second, research studies that specifically focus on the relationship between Rhythmicity and achievement are needed. There are few studies that show Rhythmicity as having a role in achievement. However, as previously noted the majority of studies examining temperament and achievement have been done with younger children. The findings from this study suggest that Rhythmicity may have a role in the academic performance of older school

children. Additional studies exploring temperament with this age group would hopefully substantiate the findings of this study. Also, the additional research may provide information on the role of the developmental processes in the relationship among stress, temperament, and achievement.

Finally, the relationship between temperament and achievement was not directly examined in the current study. However, since the results suggest that there is a relationship existing between these two variables, additional research exploring the strength and nature of the relationship is warrented.

Limitations of this Study

There were several limitations to the present study. First in regards to the temperament measure used, although the instruments used in the study were considered to be the best available for the selected age group, there were some problems encountered with the temperament measure (DOTS-R). It is felt that the lowered internal consistency of the DOTS-R contributed to the weak showing of accounted for variance attributed to the temperament constructs. An additional problem encountered with the temperament measure was that two of the temperament attributes failed to emerge in the current analysis. The absence of these two temperament attributes prevented an examination of their role in mediating the between stress and achievement.

A second criticism of this study focuses on the difficulties encountered in the assessment of the final structural model. A more thorough investigation of the constructs used for the study, may have identified the difficulties found in the model (i.e., high path coefficients that were not significant) prior to analysis. Such procedures may have also allowed for a more complete examination of the relationships among all the variables (i.e., comparison of direct and indirect effects) in the final model.

Summary

The current study was designed as an initial exploration of the relationships among stress, temperament, and academic achievement in middle-school children. Previous research has examined varying combinations of these variables, but no known study has examined the combined relationships of these three variables. The potential mediating role of temperament for stress was the major focus of this study, and the final hypothesis tested. The two additional hypotheses examined in this study focused on: 1) the relationship of children's perceived stress to achievement, and 2) which temperamental attributes are related to children's perceptions of stress.

The first part of this study focused on the relationship between stress and achievement. The major findings were as follows. First, five categories of stress were identified and labelled: Daily Hassles, Major Life Events, Affective-Anxiety, School, and Self-consciousness. Additionally, the study showed that two types of percieved stress, event-based stress and affect-based stress, exist for children. Three of the categories of stress were predictive of academic achievement. Specifically, it was the stress categories of Affective-Anxiety, School, and Self-consciousness that emerged as predictors of achievement. Two of the significant stress categories were from the affect-based type of perceived stress.

The second part of this study focused on the role of temperament in children's perceptions of stress. The major findings were as follows. Six temperament attributes emerged, which were labelled: Mood, Rhythmicity, Activity-General, Attention Span/Distractibility, Flexibility-Rigidity, and Activity- Sleep. Due to its low internal consistency, the Flexibility-Rigidity component was omitted from the analysis. Three of the temperament attributes (i.e., Mood, Rhythmicity, and Attention Span/Distractibility) were

significant predictors of children's perceptions of stress. Each of the temperament attributes were predictive of different categories of stress. This lead to the conclusion that the temperament attributes differ in their relationship with the different types of perceived stress for children. Additionally, it was concluded that the relationship between stressful life events and the characteristics of the child may not be an independent one, but instead more interactional in nature.

The final hypothesis of this study focused on the mediating role of temperament in the relationship of stress, temperament, and achievement. The results supported the existence of a relationship among aspects of these three variables. Specifically, direct and indirect effects were found in the models. The direct effects support the relationship between stress and academic achievement. The findings for indirect effects supported the mediating role of temperament, with the attribute Rhythmicity emerging as a mediator for the stress category of Affective-Anxiety. It was concluded that in middle-school children the relationship of this type of stress to achievement is mediated by the presence of regular patterns of daily habits. Furthermore, maintaining a routine pattern of daily habits may be important to children's perceptions of this type of stress.

The present study has established that a relationship does exist among stress, temperament, and achievement in middle-school children. This study has several implications for the field of education. First, it will be important for educators to know which of the categories of perceived stress are associated with academic achievement. This will allow schools to target these areas of stress for prevention and intervention programs. Additionally, since it was the affect-based stressors that emerged more frequently as related to achievement, the findings suggest that educators should consider stress

reduction programs aimed at minimizing children's emotional reactions to stress. Such programs could focus on improving self-awareness and self-esteem in children, and setting up classroom environments that are supportive and responsive to the needs (i.e., emotional) of children. Also, since this study dealt with children's perceptions of stress support is gained for stress reduction programs that are preventative rather than just remediable. It is proposed that by instituting school-wide stress reduction programs that all children would benefit. Finally, in relation to stress and achievement, it will also be important for the field of education to note that major life events and daily hassles type stress were not found to be related to academic achievement. This will hopefully allow for an increase in attention and services in those areas of perceived stress that are related to school performance in children.

A second outcome of this study that impacts on the field of education is the mediating role of temperament in the relationship between stress and achievement. The current findings lend support to the argument that temperament is a factor that should be considered in evaluating children's perceptions of stress. Specifically, it is the mediating effects of Rhythmicity in middle-school children that is emerging as important. Thus, the temperamental characteristics of the child also need to be considered when discussing children's perceptions of stress and how they are related to achievement. In terms of school and learning, this means that educators need to focus on three areas in their assessment of perceived stress in children, the life event perceived as stressful, the environmental influence (i.e., school, classroom), and the characteristics of the child. For example, in middle school children, where Rhythmicity has been shown to mediate stress, educators may want to consider children's abilities to regulate their own daily habits along

with the types of life events (i.e., affect-based or event-based) perceived as stressful and the climate of the school environment. In conclusion, this presents a challenge to school systems and educators, as it not only requires a more comprehensive look at the different variables that contribute to children's stress, but also an examination of how these variables interact in the educational environment.

Appendix A.

Brief Description of the Temperament Dimensions*

Activity	The motor component of a child's functioning.
Adaptability	The ease with which initial responses are modified in the desired reaction.
Approach	The nature of the response to something new. Displayed through mood expression or activity as approach or withdrawal.
Distractibility	The effectiveness of extraneous environmental stimuli in interfering or altering the direction of ongoing behavior.
Intensity	The energy level of behavior and responses, regardless of the quality of direction.
Mood	The amount of pleasant, joyful and friendly behavior, contrasted with unpleasant, crying and unfriendly behavior.
Persistence	The continuation of an activity direction in the face of obstacles; related to attention span or the length of time the child pursues an activity.
Predictability	The regularity or rhythmicity in timing and organization of biological functioning and other behavior.
Threshold	The intensity level of stimulation that is necessary to evoke a discernible response regardless of the specific form that the response might take or the sensory modality affected.

*Taken from Wertlieb, Weigel, Springer, & Feldstein

Appendix B

Ponaganset Middle School

91 Anan Wade Road
North Scituate, Rhode Island 02857
Telephone: (401) 647-3361

Dr. Patrick A. Hannigan
Principal

Robert D. Lavoie
Assistant Principal

May 8, 1992

Department of Psychology
The University of Rhode Island
Kingston, Rhode Island 02882-0808

Dear Ms. Lemay:

This is to confirm our conversation that the Foster/Glocester Regional School district views the data collection of your project entitled, "The impact of temperament and stress on academic achievement," as information that is valued to the educational program of the system, and as such does not require individual parental consent. Therefore you have our permission to gather data in the sixth grades of the Foster/Glocester schools on Friday, May 8, 1992. We anticipate that the summary of this information will be useful to us in understanding the stressors that may affect school performance.

Sincerely yours,

Patrick Hannigan
Principal, Ponagonset Middle School

Appendix B

Parental Consent Form
The University of Rhode Island
Department of Psychology
Kingston, Rhode Island 02881-0808

I have been asked to have my child take part in a study that will investigate the influence of stress on academic achievement. The purpose of this project is to determine what types of events create stress in children and how stress influences academic performance. Although there may be no direct benefit to my child for taking part in this study, his/her participation should contribute to a better understanding of the types of stressful events that affect children's abilities to learn and perform adequately in school. This information could prove to be very beneficial to schools and other professional agencies for planning intervention strategies for children experiencing stress. If I have questions about the study I should feel free to ask questions, and Patricia M. Lemay (the person mainly responsible for this study) will discuss them with me.

If I decide to allow my child to participate he/she will fill out three questionnaires, which will be administered in group format within the classroom. On the first two questionnaires my child will rate how stressful certain events would be for him/her, and whether or not he/she has ever experienced the particular events. On the third questionnaire my child will indicate which behaviors or activities he/she regularly engages. The questionnaires will be administered by the investigator, who will be available to assist children and answer any questions. After my child has completed the questionnaires his/her Metropolitan Achievement Test scores for the 1991-1992 academic year will be obtained from his/her records and used as a measure of academic performance. My child's responses on the questionnaires, as well as the information about his/her achievement scores will be kept confidential.

There are no risks involved with the study. Nonetheless if I decide to allow my child to participate in the study, he/she may quit at anytime. Whatever I decide will have no consequences on my child's standing in school. If I or my child wishes to stop participation, I simply inform Patricia M. Lemay of that decision. If this research project causes me or my child any harm or discomfort, I should call or write the Director of Research at 70 Lower College Road, The University of Rhode Island, Kingston, Rhode Island 02881-0808 (792-2447).

If I have any questions about the purpose or manner in which this project is conducted, I may discuss my concerns with Patricia M. Lemay ((792-2193) or with Janet Kulberg (792-4228), anonymously, if I choose.

_____
Patricia M. Lemay
Researcher

_____
Parent's Consent: I have read the Consent Form. My questions have all been answered. If I want my child to take part in this study my signature below will indicate that my child is allowed to participate. By signing this form and returning it to my child's school within one week I am indicating that my child may participate in the study described above. I have discussed the project with my child.

_____ _____
Signature of Parent Typed/printed Name of Child

Appendix B

Child Consent Form
The University of Rhode Island
Department of Psychology
Kingston, Rhode Island 02881-0808

I have been asked to take part in a study that examines the types of situations and events that cause stress for children. As part of the study I will be asked to fill out three questionnaires in my classroom. On the first two questionnaires I will be asked to rate how stressful certain events would be for most children, and if I have ever experienced the particular events. On the third questionnaire I will be asked about the behaviors or activities I regularly engage in during the day. The questionnaires will be administered by the Patricia Lemay, who will be available to assist me and answer any of my questions. If any of the items on the questionnaires make me feel uncomfortable or anxious, I do not have to answer them. I can stop participating in the study at anytime just by informing Patricia Lemay that I wish to do so. My participation in this study will not affect any of my grades in school. My responses on the questionnaires will be kept confidential, that is they will only be read by Patricia Lemay or her research assistants.

_____
Patricia M. Lemay
Researcher

_____
CHILD'S CONSENT: My parents have explained the study to me and I agree to participate. Patricia Lemay will be present when I fill out the questionnaires and she will be available to help me with any questions I may have. I know I can withdraw from the study at any time just by telling Patricia Lemay.

_____
Printed name of Child

_____ _____
Signature of Child Date

Appendix C

COPES

Children's Own Perceptions and Experiences of Stressors

These questions are from some people who want to know what things upset children. They would like you to help them by answering this questionnaire.

First, we need to know some information about you.

Name _____

How old are you? _____

School _____ Grade _____

Boy _____ Girl _____ (check one)

Are you: Black _____ White _____ Hispanic _____

Another ethnic group _____

Father's occupation _____ Mother's occupation _____

Remember there are no right or wrong answers. Just mark what you think.

THANKS FOR ANSWERING ALL OF THESE QUESTIONS!!

COPES (Colton, 1984)

Please circle the number for each statement to show how upsetting you think it is or would be for most children.

		Not Upsetting at All	A Little Upsetting	Upsetting	Very Upsetting	Extremely Upsetting
1.	Nobody likes you or wants to be your friend.	1	2	3	4	5
2.	Being suspended from school.	1	2	3	4	5
3.	Thoughts about death.	1	2	3	4	5
4.	Getting into big trouble.	1	2	3	4	5
5.	Having to repeat a grade in school.	1	2	3	4	5
6.	Having a fight with your best friend.	1	2	3	4	5
7.	You don't have enough money.	1	2	3	4	5
8.	Being embarrassed.	1	2	3	4	5
9.	Moving.	1	2	3	4	5
10.	Being forced to do something you don't want to do.	1	2	3	4	5
11.	Too many things to do.	1	2	3	4	5
12.	Your parent loses their job.	1	2	3	4	5
13.	Too much homework to do every evening.	1	2	3	4	5
14.	Having your teacher yell at you in front of the class.	1	2	3	4	5
15.	People are unfair to you.	1	2	3	4	5
16.	Your mother having to work.	1	2	3	4	5
17.	Someone you know using alcohol.	1	2	3	4	5
18.	You or someone in your family having to go into the hospital.	1	2	3	4	5
19.	Having problems with older children.	1	2	3	4	5

		Not Upsetting at All	A Little Upsetting	Upsetting	Very Upsetting	Extremely Upsetting
20.	Not being allowed to something that you want to do.	1	2	3	4	5
21.	Getting blamed for something you didn't do	1	2	3	4	5
22.	Something of yours gets stolen.	1	2	3	4	5
23.	Not knowing who to trust.	1	2	3	4	5
24.	Can't concentrate.	1	2	3	4	5
25.	Marriage of your parent to a step-parent.	1	2	3	4	5
26.	Having a lot of disagreements with your family.	1	2	3	4	5
27.	Trouble with reading, writing, spelling or math.	1	2	3	4	5
28.	Meeting new step-brothers and step-sisters.	1	2	3	4	5
29.	Not getting approval from others.	1	2	3	4	5
30.	Choosing which divorced parent you want to live with.	1	2	3	4	5
31.	Being disappointed by someone (they break a promise).	1	2	3	4	5
32.	Fighting.	1	2	3	4	5
33.	Parents who are too worried about your schoolwork.	1	2	3	4	5
34.	Being interrupted - they don't let you finish a sentence.	1	2	3	4	5
35.	Concerns about how you look (your weight or height).	1	2	3	4	5
36.	Having problems with brothers and sisters.	1	2	3	4	5

		Not Upsetting at All	A Little Upsetting	Upsetting	Very Upsetting	Extremely Upsetting
37.	Your parents separating.	1	2	3	4	5
38.	Being ignored.	1	2	3	4	5
39.	Divorce of your parents.	1	2	3	4	5
40.	Being laughed at, teased, made fun of, or called names.	1	2	3	4	5
41.	Needing special help in school.	1	2	3	4	5
42.	Being betrayed by someone when you thought they were your friend and you trusted them.	1	2	3	4	5
43.	Getting poor grades in school.	1	2	3	4	5
44.	Telling the truth but no one believing you.	1	2	3	4	5
45.	Being lonely.	1	2	3	4	5
46.	Being caught stealing. something	1	2	3	4	5
47.	Your pet runs away or dies.	1	2	3	4	5
48.	Getting along with step-brothers and step-sisters.	1	2	3	4	5
49.	Getting punished, grounded, or yelled at.	1	2	3	4	5
50.	Being compared to others.	1	2	3	4	5
51.	Hearing arguements among your family members.	1	2	3	4	5
52.	Being in your house all alone.	1	2	3	4	5
53.	Someone you love or care about dies.	1	2	3	4	5
54.	Getting lost in a strange place.	1	2	3	4	5

		Not Upsetting at All	A Little Upsetting	Upsetting	Very Upsetting	Extremely Upsetting
55.	People taking advantage of you.	1	2	3	4	5
56.	Having to wait for something.	1	2	3	4	5
57.	Someone you know using drugs.	1	2	3	4	5
58.	Not being able to perform like other kids, but being expected to do so.	1	2	3	4	5

Now please circle yes or no for the two questions.

		Has this ever happened to you?		When it happened did it upset you or did you worry?	
1.	Nobody likes you or wants to be your friend.	yes	no	yes	no
2.	Being suspended from school.	yes	no	yes	no
3.	Thoughts about death.	yes	no	yes	no
4.	Getting into big trouble.	yes	no	yes	no
5.	Having to repeat a grade in school.	yes	no	yes	no
6.	Having a fight with your best friend.	yes	no	yes	no
7.	You don't have enough money.	yes	no	yes	no
8.	Being embarrassed.	yes	no	yes	no
9.	Moving.	yes	no	yes	no
10.	Being forced to do something you don't want to do.	yes	no	yes	no
11.	Too many things to do.	yes	no	yes	no
12.	Your parent loses their job.	yes	no	yes	no
13.	Too much homework to do every evening.	yes	no	yes	no
14.	Having your teacher yell at you in front of the class.	yes	no	yes	no
15.	People are unfair to you.	yes	no	yes	no
16.	Your mother having to work.	yes	no	yes	no
17.	Someone you know using alcohol.	yes	no	yes	no
18.	You or someone in your family having to go into the hospital.	yes	no	yes	no

		Has this ever happened to you?		When it happened did it upset you or did you worry?	
19.	Having problems with older children.	yes	no	yes	no
20.	Not being allowed to something that you want to do.	yes	no	yes	no
21.	Getting blamed for something you didn't do.	yes	no	yes	no
22.	Something of yours gets stolen.	yes	no	yes	no
23.	Not knowing who to trust.	yes	no	yes	no
24.	Can't concentrate.	yes	no	yes	no
25.	Marriage of your parent to a step-parent.	yes	no	yes	no
26.	Having a lot of disagreements with your family.	yes	no	yes	no
27.	Trouble with reading, writing, spelling or math.	yes	no	yes	no
28.	Meeting new step-brothers and step-sisters.	yes	no	yes	no
29.	Not getting approval from others.	yes	no	yes	no
30.	Choosing which divorced parent you want to live with.	yes	no	yes	no
31.	Being disappointed by someone (they break a promise).	yes	no	yes	no
32.	Fighting.	yes	no	yes	no
33.	Parents who are too worried about your schoolwork.	yes	no	yes	no
34.	Being interrupted - they don't let you finish a sentence.	yes	no	yes	no
35.	Concerns about how you look (your weight or height).	yes	no	yes	no

		Has this ever happened to you?		When it happened did it upset you or did you worry?	
36.	Having problems with brothers and sisters.	yes	no	yes	no
37.	Your parents separating.	yes	no	yes	no
38.	Being ignored.	yes	no	yes	no
39.	Divorce of your parents.	yes	no	yes	no
40.	Being laughed at, teased, made fun of, or called names.	yes	no	yes	no
41.	Needing special help in school.	yes	no	yes	no
42.	Being betrayed by someone when you thought they were your friend and you trusted them.	yes	no	yes	no
43.	Getting poor grades in school.	yes	no	yes	no
44.	Telling the truth but no one believing you.	yes	no	yes	no
45.	Being lonely.	yes	no	yes	no
46.	Being caught stealing something.	yes	no	yes	no
47.	Your pet runs away or dies.	yes	no	yes	no
48.	Getting along with step-brothers and step-sisters.	yes	no	yes	no
49.	Getting punished, grounded, or yelled at.	yes	no	yes	no
50.	Being compared to others.	yes	no	yes	no
51.	Hearing arguements among your family members.	yes	no	yes	no
52.	Being in your house all alone.	yes	no	yes	no
53.	Someone you love or care about dies.	yes	no	yes	no
54.	Getting lost in a strange place.	yes	no	yes	no

		Has this ever happened to you?		When it happened did it upset you or did you worry?	
55.	People taking advantage of you.	yes	no	yes	no
56.	Having to wait for something.	yes	no	yes	no
57.	Someone you know using drugs.	yes	no	yes	no
68.	Not being able to perform like other kids, but being expected to do so.	yes	no	yes	no

Appendix D

HOW DO YOU FEEL?

Your name: _____ Your school: _____

Your Age: _____ Grade: _____ Boy or Girl (circle one)

Today is: _____

Twenty things (events) are listed below. Some of these have actually happened to you, others may have also happened. All are rather upsetting, and you know the feeling. Please think about each event, and decide how upsetting it is to you. If the event disturbs you very very much, circle 7 (the most upsetting). If the event upsets you very very little, circle 1 (the least upsetting). If it is somewhere in between, circle one of the numbers between 1 and 7 - - as in the example below. After that, show whether that event really happened to you personally by circling either Yes or No.

EXAMPLE: In thinking about the following event, I feel that it is upsetting to have something of mine stolen. But that is not the most upsetting of all the things that can happen to me either. So, I look at 4, 5, and 6 as my possible choices and decide upon 5. I circle 5. I then circle Yes, because my bicycle was stolen about two months ago.

		The least upsetting					The most upsetting		Has this actually happened to you?	
0)	Having something of mine stolen	1	2	3	4	5	6	7	Yes	No

****

		The least upsetting					The most upsetting		Has this actually happened to you?	
1)	Having a new baby sister or brother.	1	2	3	4	5	6	7	Yes	No
2)	Getting lost in some strange place.	1	2	3	4	5	6	7	Yes	No
3)	Receiving a poor report card.	1	2	3	4	5	6	7	Yes	No

		The least upsetting						The most upsetting	Has this actually happened to you?	
4)	Being caught stealing something.	1	2	3	4	5	6	7	Yes	No
5)	Going to the dentist.	1	2	3	4	5	6	7	Yes	No
6)	Telling the truth, but no one believing me.	1	2	3	4	5	6	7	Yes	No
7)	Losing my mother or father.	1	2	3	4	5	6	7	Yes	No
8)	Being picked last on a team.	1	2	3	4	5	6	7	Yes	No
9)	Moving to a new school.	1	2	3	4	5	6	7	Yes	No
10)	Going blind.	1	2	3	4	5	6	7	Yes	No
11)	Being laughed at in front of the class.	1	2	3	4	5	6	7	Yes	No
12)	Losing in any game or sport.	1	2	3	4	5	6	7	Yes	No
13)	Being kept in the same grade next year.	1	2	3	4	5	6	7	Yes	No
14)	Wetting pants in class.	1	2	3	4	5	6	7	Yes	No
15)	Going to a hospital for an operation.	1	2	3	4	5	6	7	Yes	No
16)	Having a scary dream.	1	2	3	4	5	6	7	Yes	No
17)	Being sent to the principal's office.	1	2	3	4	5	6	7	Yes	No
18)	Not making a perfect score (100) on a test.	1	2	3	4	5	6	7	Yes	No
19)	Getting up in front of the class to give a report.	1	2	3	4	5	6	7	Yes	No
20)	Hearing my parents quarrel and fight.	1	2	3	4	5	6	7	Yes	No

Appendix E

DOTS-R: Child (Self)

REVISED DIMENSIONS OF TEMPERAMENT SURVEY - CHILD (SELF)

Your Name:_____Today's Date:_____

Age: I am ____ years and _____ months old. Date of Birth:_____

Sex: Boy _____ Girl _____

Race: White _____ Black _____ Oriental _____

Other _____

HOW TO ANSWER: On the following pages are some sentences. They are about how children like you may behave. Some of the sentences may be true of how you behave and others may not be true for you. For each sentence we would like you to say if the sentence is usually true for you, is more true than false for you, is more false than true for you, or is usually false for you. There are no "right" or "wrong" answers because all children behave in different ways. All you have to do is answer what is true for you.

Here is an example of how to fill out this questionnaire. Suppose a sentence said:

"I eat the same thing for breakfast every day."

If the sentence were usually false for you, you would respond:

"A," usually FALSE.

If the sentence were more false than true for you, you would respond:

"B," more FALSE than TRUE.

If the sentence were more true than false for you, you would respond:

"C," more TRUE than FALSE.

If the sentence were usually true for you, you would respond:

"D," usually TRUE.

On the line to the left of each sentence write A if the sentence is usually false for you, write B is the sentence is more false than true for you, write C if the sentence is more true than false for you, or write D if the sentence is usually true for you.

DOTS-R: Child (Self)

PLEASE REMEMBER THESE FOUR THINGS AS YOU ANSWER:

1. Give only answers that really tell about you. It is best to say what you really think.

2. Don't spend too much time thinking over each question. Give the first answer as it comes to you. Of course, the sentences are too short to say everything you might like. But give the best answer you can. Some sentences may seem just like others because they are about the same things. But, each sentence asks about a different part of the way you behave. Therefore, your answers may be different.

3. Answer every question one way or the other. Don't skip any.

4. Remember, A = usually FALSE
   B = more FALSE than true
   C = more TRUE than false
   D = usually TRUE

THANK YOU FOR ALL YOUR HELP!!!!

A = Usually FALSE — C = more TRUE than FALSE

B = more FALSE than TRUE — D = usually TRUE

1._____ It takes me a long time to get used to a new thing in the home.
2._____ I can't stay still for long.
3._____ I laugh and smile at a lot of things.
4._____ I wake up at different times.
5._____ Once I am involved in a task, nothing can distract me from it.
6._____ I persist at a task until it's finished.
7._____ I move around a lot.
8._____ I can make myself at home anywhere.
9._____ I can always be distracted by something else, no matter what I may be doing.
10._____I stay with an activity for a long time.
11._____If I have to stay in one place for a long time, I get very restless.
12._____I usually move towards now objects shown to me.
13._____It takes me a long time to adjust to new schedules.

DOTS-R: Child (Self)

A = Usually FALSE C = more TRUE than FALSE

B = more FALSE than TRUE D = usually TRUE

14._____I do not laugh or smile at many things.

15._____If I am doing one thing, something else occurring won't get me to stop.

16._____I eat about the same amount for dinner whether I am home, visiting someone, or traveling.

17._____My first reaction is to reject something new or unfamiliar to me.

18._____Change in plans make me restless.

19._____ I often stay still for long periods of time.

20._____ Things going on around me can not take me away from what I am doing.

21._____ I take a nap, rest, or break at the same times every day.

22._____ Once I take something up, I stay with it.

23._____ Even when I am supposed to be still, I get very fidgety after a few minutes.

24._____ I am hard to distract.

25._____ I usually get the same amount of sleep each night.

26._____ On meeting a new person I tend to move towards him or her.

27._____I get hungry about the same time each day.

28._____I smile often.

29._____I never seem to stop moving.

30._____It takes me no time at all to get used to new people.

31._____ I usually eat the same amount each day.

32._____I move a great deal in my sleep.

33._____I seem to get sleepy just about the same time every night.

34._____ I do not find that I laugh often.

35._____I move towards new situations.

36._____When I am away from home I still wake up at the same time each morning.

37._____ I eat about the same amount at breakfast from day to day.

38._____ I move a lot in bed.

DOTS-R: Child (Self)

A = Usually FALSE C = more TRUE than FALSE

B = more FALSE than TRUE D = usually TRUE

39._____I feel full of pep and energy about the same time each day.
40._____I have bowel movements at about the same time each day.
41._____No matter when I go to sleep, I wake up at the same time the next morning.
42._____In the morning, I am still in the same place as I was when I fell asleep.
43._____ I eat about the same amount at supper from day to day.
44._____ When things are out of place, it takes me a long time to get used to it.
45._____ I wake up at the same time on weekends and holidays as on other days of the week.
46._____ I don't move around much at all in my sleep.
47._____My appetite seems to stay the same day after day.
48._____ My mood is generally cheerful.
49._____ I resist changes in routine.
50._____ I laugh several times a day.
51._____ My first response to anything new is to move my head towards it.
52._____ Generally I am happy.
53._____ The number of times I have a bowel movement on any day varies from day to day.
54._____I never seem to be in the same place for long.

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